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Permit Applicants' Guidance Manual for the General Facility Standards of 40 CFR 264

GCA Corp., Bedford, MA

Prepared for

Environmental Protection Agency, Washington, DC

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Office of Solid Waste
and Emergency Response
Washington DC 20460

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Solid Waste

Permit Applicants' Guidance Manual for the General Facility Standards of 40 CFR 264

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This manual is intended for use by owners and operators of existing and new hazardous waste management facilities who are required to submit Part B of their permit application to illustrate compliance with the standards of 40 CFR 264. This document addresses the general information and requirement contained in 40 CFR 270 and 264.

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PERMIT APPLICANT'S GUIDANCE
MANUAL FOR THE GENERAL FACILITY
STANDARDS OF 40 CFR 264

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Final Report

U.S. ENVIRONMENTAL PROTECTION AGENCY
1983

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DISCLAIMER

This Final Report was furnished to the Environmental Protection Agency by the GCA Corporation, GCA/Technology Division, Bedford, Massachusetts 01730, in fulfillment of Contract No. 68-02-3168, Assignment No. 95-(3). The opinions, findings, and conclusions expressed are based on the best information currently available. As new data and information are obtained, the manual may be revised to reflect that situation. Mention of company or product names is not to be considered as an endorsement by the Environmental Protection Agency.

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1.0 INTRODUCTION

1.1 PURPOSE

This manual is intended for use by owners and operators of existing and new hazardous waste management facilities who are required to submit Part B of their permit applications to illustrate compliance with the standards of 40 CFR 264.* If you are currently operating an existing facility under interim status (40 CFR 265), you will have submitted Part A of your application. Owners and operators of new facilities must submit Parts A and B together.

The Part 264 standards have been adopted under the Resource Conservation and Recovery Act and will be used by the EPA to issue permits to facilities that treat, store, or dispose of hazardous waste. The standards identify general requirements that all hazardous waste management facilities must meet and specific requirements applicable to specific types of facilities. This manual presents guidance on methods that you should use in preparing your Part B permit application to demonstrate compliance with the general requirements of 40 CFR 264 listed in Subparts A through E of that Part. The guidance is applicable to owners and operators of facilities regulated under 40 CFR 264, namely; tanks, containers, surface impoundments, waste piles, land treatment facilities, and landfills. Although much of the guidance is applicable to hazardous waste incinerators, it is not the primary intent of this manual to address application requirements for incinerators. A separate manual on permitting of incinerators is available through the EPA Regional Offices and is entitled: "The Guidance Manual for Hazardous Waste Incinerator Permits," (July 1983).

1.2 PROVISIONS OF THE MANUAL

The information which you are required to submit in the Part B permit application to demonstrate compliance with the land disposal standards is stipulated in 40 CFR 270 which establishes the requirements of the EPA's permit program for hazardous waste management facilities. The general information requirements which you must address are contained in §270.14(b) of that Part. The information required under that section includes:

(1) general facility description

(2) chemical and physical analysis of hazardous wastes to be handled

(3) waste analysis plan

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*If you are unfamiliar with RCRA and associated regulations and/or conventions used for referencing them, it is suggested that you refer to Sections 2.0 and 3.0 of this manual for a full explanation.

(4) security procedures

(5) inspection plans

(6) plans for preparedness and prevention

(7) contingency plans

(8) procedures and equipment to prevent or mitigate hazards

(9) precautions taken to prevent ignition or reaction of wastes

(10) planned traffic patterns

(11) facility location information

(12) training programs

(13) facility closure plans

(14) facility deed documentation

(15) closure cost estimates and financial assurances

(16) post-closure cost estimates and financial assurances

(17) insurance policies

(18) coverage by State financial mechanisms

(19) topographic map for the facility and environs.

In this manual, guidance is provided to illustrate means of addressing the first 12 information requirements as well as the 19th, topographic map information. Each of the 13 information requirements is addressed individually. For each one, the information presented includes the applicable regulatory citations, guidance on achieving the information requirements and referenced standards, examples of suitable application information, and major points to address in preparing your application. Guidance on the manifest requirements noted in Subpart E of Part 264 is also provided.

Although the guidance noted above is the main intent of this manual, introductory and background information is also included to provide better understanding of the regulations and the permitting process. Several appendices which augment the information in the main text are also included. If you prepare your application in conformance with the guidance presented here on the general information requirements, it will, at a minimum, expedite agency review of your application, and should markedly improve the likelihood of being granted a permit.

1.3 ORGANIZATION OF THE MANUAL

Introductory Sections 2.0 and 3.0 explain the Resource Conservation and Recovery Act (RCRA), regulations implemented under RCRA, format and use of the Federal Register, and the RCRA permitting process employed by EPA. In Section 4.0, we discuss useful sources of information that will assist you in preparing your application and provide an overview of the requirements of 40 CFR Parts 264, 265, and 270. If you are unfamiliar with any of the noted topics, these sections are essential reading before proceeding to the guidance presented in Section 5.0.

As noted, you should use the guidance on procedures and methods in Section 5.0 to prepare those parts of your Part B application which support the information requirements of §270.14(b), paragraphs (1) through (12) and (19). Each information requirement is addressed separately in a subsection of Section 5.0.

Six appendices are included at the end of the manual to provide supplementary information such as names and addresses of state and federal regulatory agencies, and locations where you can request pertinent documentation, reports, and maps. Other appendix information of a more technical nature is also included.

1.4 OTHER GUIDANCE MANUALS

Several other guidance manuals exist or are in preparation and will be of use to you in preparing your overall Part B permit application. These include RCRA guidance manuals published with the Part 264 standards in July 1982; a series of Technical Resource Documents which have been prepared over the last 5 years, and other guidance manuals specific to preparing permit applications in support of the land disposal regulations and specific subparts of those regulations. Section 4.0 and Appendices A and B provide a list of pertinent documents, locations where they can be reviewed or purchased, and a synopsis of each document. It is recommended that you become familiar with the available literature, because in total, this body of information will be of great assistance in preparing a permit application.

1.5 PROCEDURES FOR UPDATING AND REVISING THIS MANUAL

This manual is published in loose leaf format to allow for future updating or revision. When you receive your copy, your name will be kept on file and the Agency will notify you of the availability of new or amended pages for incorporation into the manual.

2.0 THE LAW

2.1 INTRODUCTION

In 1976, the Resource Conservation and Recovery Act was passed by the Congress to regulate the handling and disposal of hazardous waste. That act, widely known by the acronym RCRA, mandated the development of regulations governing the actions of owners or operators who generate, transport, treat, store, or dispose of solid wastes. Although most readers of this guidance manual will be aware of RCRA because of the extensive regulations developed under its authority governing hazardous waste, the Act, in fact, addresses all solid wastes.

The Congress passed a second Act which addresses the problems associated with the handling and disposal of solid wastes, especially hazardous wastes. The "Comprehensive Environmental Response, Compensation, and Liability Act of 1980" (CERCLA) is the Act that established the "Superfund" (called the Hazardous Substance Response Trust Fund in the Act). This Act, in general, addresses the release, or imminent release, of hazardous substances to the environment and the established mechanisms for responding to those releases and assessing liabilities. As such, Superfund is not applicable to permitting of hazardous waste management facilities.

The complete texts of RCRA and its associated amendments are too long for inclusion in this document. The end of this section includes information on where interested parties may obtain copies of the Act and other related laws and regulations. Additionally, regulatory citations are included in Section 5.0 to help define the permit application information requirements.

RCRA, as amended by the Quiet Communities Act of 1978, the Used Oil Recycling Act of 1980, and the Solid Waste Disposal Act Amendments of 1980, is, itself, an amendment of Title II of the Solid Waste Disposal Act. The beginning of the Act and its Table of Contents are shown in Table 2-1.

As Table 2-1 shows, RCRA consists of eight parts, called Subtitles, identified as A through H. Each Subtitle contains parts called Sections which are numbered consecutively within each Subtitle. Table 2-1 is actually a reproduction of Section 1001 of Subtitle A of the Act.

"Subtitle C--Hazardous Waste Management" incorporates 13 sections which serve as the basis for the development of the hazardous waste regulations which have been promulgated by the EPA. Subtitle C states what the EPA must do to govern hazardous waste handling and disposal and provides the EPA with the authority to carry out the provisions of the Act. Specifically, the various Sections of Subtitle C of RCRA state that "the Administrator* . . . shall promulgate regulations . . ." Thus, the Legislative Branch passed a Law

---

*Defined in Section 1004 of Subtitle A of RCRA as "the Administrator of the Environmental Protection Agency."

TABLE 2-1. THE RCRA TABLE OF CONTENTS

RESOURCE CONSERVATION AND RECOVERY ACT OF 1976,

As Amended by the Quiet Communities Act of 1978, the Used Oil Recycling Act of 1980 and the Solid Waste Disposal Act Amendments of 1980

An Act

Short Title

Section 1. This Act may be cited as the "Resource Conservation and Recovery Act of 1976"

AMENDMENT OF SOLID WASTE DISPOSAL ACT

Section 2. The Solid Waste Disposal Act (42 U.S.C. 3251 and following) is amended to read as follows:

TITLE II - SOLID WASTE DISPOSAL

"Subtitle A--General Provisions

"Short Title and Table of Contents

"Sec. 1001. This title (hereinafter in this title referred to as this Act'), together with the following table of contents, may be cited as the 'Solid Waste Disposal Act':

"Subtitle A--General Provisions

"Sec. 1001.	Short title and table of contents.
"Sec. 1002.	Congressional findings.
"Sec. 1003.	Objectives.
"Sec. 1004.	Definitions.
"Sec. 1005.	Governmental cooperation.
"Sec. 1006.	Application of Act and integration with other Acts.
"Sec. 1007.	Financial disclosure.
"Sec. 1008.	Solid waste management information and guidelines.

"Subtitle--Office of Solid Waste; Authorities of the Administrator

"Sec. 2001.	Office of Solid Waste and Interagency Coordinating Committee.
"Sec. 2002.	Authorities of Administrator.
"Sec. 2003.	Resource recovery and conservation panels.
"Sec. 2004.	Grants for discarded tire disposal.
"Sec. 2005.	Labeling of certain oil.
"Sec. 2006.	Annual report.
"Sec. 2007.	General authorization.

"Subtitle C--Hazardous Waste Management

"Sec. 3001.	Identification and listing of hazardous waste.
"Sec. 3002.	Standards applicable to generators of hazardous waste.
"Sec. 3003.	Standards applicable to transporters of hazardous waste.
"Sec. 3004.	Standards applicable to owners and operators of hazardous waste treatment, storage, and disposal facilities.
"Sec. 3005.	Permits for treatment, storage, or disposal of hazardous waste.
"Sec. 3006.	Authorized State hazardous waste programs.
"Sec. 3007.	Inspections.
"Sec. 3008.	Federal enforcement.
"Sec. 3009.	Retention of State authority.
"Sec. 3010.	Effective date.
"Sec. 3011.	Authorization of assistance to States.
"Sec. 3012.	Restrictions on recycled oil.
"Sec. 3013.	Monitoring, analysis, and testing.

(continued)

TABLE 2-1 (continued)

"Subtitle D--State or Regional Solid Waste Plans	
"Sec. 4001.	Objectives of subtitle.
"Sec. 4002.	Federal guidelines for plans.
"Sec. 4003.	Minimum requirements for approval of plans.
"Sec. 4004.	Criteria for sanitary landfills; sanitary landfills required for all disposal.
"Sec. 4005.	Upgrading of open dumps.
"Sec. 4006.	Procedure for development and implementation of State plan.
"Sec. 4007.	Approval of State plan; Federal assistance.
"Sec. 4008.	Federal assistance.
"Subtitle E--Duties of the Secretary of Commerce in Resource and Recovery	
"Sec. 5001.	Functions.
"Sec. 5002.	Development of specifications for secondary materials.
"Sec. 5003.	Development of markets for recovered materials.
"Sec. 5004.	Technology promotion.
"Sec. 5005.	Nondiscrimination requirement.
"Sec. 5006.	Authorization of applications.
"Subtitle F--Federal Responsibilities	
"Sec. 6001.	Application of Federal, State, and local law to Federal facilities.
"Sec. 6002.	Federal procurement.
"Sec. 6003.	Cooperation with Environmental Protection Agency.
"Sec. 6004.	Applicability of solid waste disposal guidelines to executive agencies.
"Subtitle G--Miscellaneous Provisions	
"Sec. 7001.	Employee protection.
"Sec. 7002.	Citizen suits.
"Sec. 7003.	Imminent hazard.
"Sec. 7004.	Petition for regulations; public participation.
"Sec. 7005.	Separability.
"Sec. 7006.	Judicial review.
"Sec. 7007.	Grants or contracts for training projects.
"Sec. 7008.	Payments.
"Sec. 7009.	Labor standards
"Subtitle H--Research, Development, Demonstration, and Information	
"Sec. 8001.	Research, demonstrations, training, and other activities.
"Sec. 8002.	Special studies, plans or research, development, and demonstrations.
"Sec. 8003.	Coordination, collection, and dissemination of information.
"Sec. 8004.	Full scale demonstration facilities.
"Sec. 8005.	Special study and demonstration projects on recovery of useful energy and materials.
"Sec. 8006.	Grants for recovery systems and improved solid waste disposal facilities.
"Sec. 8007.	Authorization of appropriations.

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requiring the Executive Branch to develop and implement regulations governing hazardous waste. This is done by publishing the regulations in the Federal Register and subsequently incorporating them into the Code of Federal Regulations.

2.2 THE FEDERAL REGISTER

The Executive Branch implements the intentions of Laws passed by the Legislative Branch by developing and enforcing Rules or Regulations. RCRA specifically required the EPA to promulgate those regulations only after public notice, the opportunity for public hearings, and consultation with appropriate Federal and State agencies. The EPA meets these requirements by publishing notices of its intentions to promulgate regulations in the Federal Register. Once promulgated, the regulations become part of the Code of Federal Regulations (CFR).

The Federal Register is published every business day by the Federal Government. It contains notices, announcements, and descriptions of the activities of the Federal Government.

In the process of implementing the Congress' intentions as contained in RCRA, the EPA developed regulations, published them in the Federal Register as proposed regulations, received and reviewed comments on the proposed regulations, revised the regulations as appropriate in light of the comments, and then published the final regulations in the Federal Register. Thus, by publishing in the Federal Register, the EPA announces its activities to the public a minimum of twice; once via a Notice of Proposed Rulemaking (NPR) and once by publishing the final, promulgated rule.* This is the general rulemaking procedure followed by the EPA. However, because of the complexity of the hazardous waste regulation development efforts, the EPA made numerous other announcements in the Federal Register in addition to the proposed and final rule announcements.

A list and description of all the types of Notices that EPA published in the Federal Register relative to the hazardous waste regulations is much too lengthy and complex to serve any purpose in this document. The EPA began publishing notices regarding the hazardous waste regulations in 1978 and announcements regarding those regulations continue to appear regularly in the Federal Register. The types of Notices that are likely to be of most value to readers of this manual are Proposed Rules, Final Rules, and Amendments to Rules. The format and purpose of these Notice types are discussed here.

A Federal Register Notice of Proposed, Final, or Amended Rules will always be in a format that consists of three major parts; heading, preamble, and text. Table 2-2 is a photocopy of two pages of an actual multiple-page Federal Register Notice. The part of that Notice designated by a (1) is the heading, by a (2) is the preamble, and by a (3) is the text of the actual rule.

---

*A regulation is "promulgated" when it is published as a Final Rule in the Federal Register.

TABLE 2-2. EXAMPLE FEDERAL REGISTER NOTICE

①

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 122, 123 and 264

[SW FRL 2039-2]

Hazardous Waste Management System; the Hazardous Waste Permit Program; Standards Applicable to Owners and Operators of Hazardous Waste Management Facilities

AGENCY: Environmental Protection Agency.

ACTION: Proposed rule.

②

SUMMARY: On February 26, 1980 and May 19, 1980, the Environmental Protection Agency (EPA) published regulations which established a system to manage hazardous waste. Those regulations provide that permits issued by EPA (and States with authorization to issue permits under the Resource Conservation and Recovery Act (RCRA) for hazardous waste treatment, storage and disposal facilities will be effective for a fixed term not to exceed 10 years. During the fixed term, EPA and authorized States have limited opportunities for reopening a permit to make changes in permit conditions.

EPA is today proposing to amend the regulations to provide that RCRA permits will be effective for the designated operating life of each facility, and the period of post-closure care for land disposal facilities. Under this proposal, EPA and authorized States would have increased opportunities for reopening permits during their terms. EPA is proposing this change in an effort to streamline the RCRA permitting procedure, reduce paperwork, and to respond to settlement negotiations in a lawsuit involving the RCRA regulations.

EPA anticipates that protection of human health and the environment would not be affected by this section. EPA also estimates that this action would result in a savings to the regulated community of approximately $88.5 million if EPA promulgates this rule and if States with authorization to issue RCRA permits elect to issue those permits effective for the designed operating life of each facility plus the post-closure period.

DATES: EPA will accept public comments on the proposed amendment until April 11, 1983.

ADDRESSES: Comments should be addressed to the Docket Clerk, Office of Solid Waste (WH-562), U.S. Environmental Protection Agency, Washington, D.C. 20460. Communications should identify the regulatory docket number as "Section 122.9—Duration of Permits".

The public docket for this proposed rule is located in Room S-269C, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, D.C., and is available for viewing from 9:00 a.m. to 4:00 p.m. Monday through Friday excluding holidays.

FOR FURTHER INFORMATION CONTACT: Amy Mills, Office of Solid Waste (WH-563), U.S. Environmental Protection Agency, Washington, D.C. 20460, or call (202) 382-4755, or the RCRA Hotline at (800) 424-9346 or (202) 382-3000.

SUPPLEMENTARY INFORMATION:

I. Background

②

On February 26, 1980 and May 19, 1980, EPA promulgated regulations pursuant to the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976 (RCRA), as amended, 42 U.S.C. 6901 *et seq*. The regulations establish a system to manage hazardous waste, and include provisions under which EPA issues permits to owners or operators of facilities that treat, store or dispose of hazardous waste (40 CFR Part 122, 45 FR 33418).[1] Section 122.9 of those regulations specifies that permits issued to hazardous waste management facilities will be effective for a fixed term of 10 years or less. At the end of each permit term, the permittee must apply for and receive a new permit if he plans to continue his operation. The purpose of this requirement is to assure changes in regulations or available technology are integrated into permits on a periodic basis.

The May 19 rule also contains a provision which gives EPA the opportunity to revise permit conditions during the term of the permit (§ 122.15). For most of the allowable causes for permit modifications, EPA may initiate a change with or without the consent of the permittee (§ 122.15(a) (1), (2), and (5) and 122.15(b)). However, in an attempt to provide permittees with greater certainty during the terms of their permits, the May 19 regulations limited the cause for permit modifications resulting from changes to EPA regulations to instances when modification is requested by the permittee (§ 122.15(a)(3)).

EPA has re-examined the maximum 10-year permit term and its implications for both the regulated community and the Agency. The subject arose in recent negotiations in a lawsuit involving the consolidated permit regulations. (*NRDC v EPA*, No. 80-1607 and consolidated cases, D.C. Cir., filed June 2, 1980).[2] The petitioners in that case claim that the current regulations unreasonably require EPA to repeatedly review an entire facility's operation every 10 years or less, and reopen and re-evaluate all of the issues which were resolved when the initial permit was issued. Some facilities are designed to operate 30 years or more; thus, under the current regulations an entire facility may be re-evaluated three or more times during its operating life. These extensive re-evaluations would proceed regardless of whether there had been any substantive changes in the facility's design or operation, or in the regulations on which its initial permit had been based.

The petitioners further claim that repeating the permit application process every 10 years or less can lose a significant burden to the regulated community. First, there can be a substantial monetary burden associated with the extensive paperwork involved in applying for a permit. Second, the 10-year permit presents disadvantages to the facility owner who may plan to operate for more than 10 years but can only obtain approval for his facility for 10 years at a time.

EPA agrees that the curent limit to permit duration can pose certain disadvantages to the regulated community. The Agency also finds that the procedures for issuing permits, i.e., reviewing each permit application, preparing a draft permit, providing an opportunity for public hearing, and preparing a final permit, can be very time-consuming and resource-intensive for the Agency. Under the current regulations, EPA would have to repeat these procedures at least once every 10 years for each facility.

EPA wishes to avoid the unnecessary expiration and reissuance of permits at arbitrary intervals of 10 years or less and the attendant costs and paperwork burdens. At the same time, the Agency believes it must maintain some oversight of the operation of a facility during the term of its permit. Therefore, EPA is today proposing an approach which

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[1] The RCRA permitting requirements are contained in EPA's consolidated permit regulations, originally promulgated on May 19, 1980 and codified in 40 CFR Parts 122-124. These regulations have been continuously supplemented and amended. The most important amendments occurred on January 12, 1981, when EPA promulgated permitting regulations for storage and treatment facilities (46 FR 2802); on January 23, 1981, when EPA promulgated permitting regulations for incinerators (46 FR 7666); and July 26, 1982, when EPA promulgated permitting regulations for land disposal facilities (47 FR 32274).

[2] *For further explanation of the procedural aspects of the NRDC v EPA suit, see the preamble to the technical amendments to 40 CFR Parts 122 and 124 in the April 8, 1982 Federal Register* (47 FR 15304).

Reproduced from best available copy.

TABLE 2-2 (continued)

years or less. The Agency believes that this is not the type of regulation revision that Congress had in mind when it provided a delay between the promulgation and the effective date of revisions to regulations. Therefore, the Agency plans to make these amendments effective immediately if and when they are promulgated in final form, but requests comments on whether such action would cause hardship for the regulated community or otherwise be inappropriate.

Compliance With Executive Order 12291

Under Executive Order 12291, EPA must judge whether a regulation is "major" and therefore subject to the requirement of a Regulatory Impact Analysis. This proposed regulation is not major because it will not result in an effect on the economy of $100 million or more, nor will it result in an increase in costs or prices to industry. There would be no adverse impact on the ability of U.S.-based enterprises to compete with foreign-based enterprises in domestic or export markets. Because this amendment is not a major regulation, no Regulatory Impact Analysis is being conducted.

These amendments were submitted to the Office of Management and Budget for review as required by Executive Order 12291. Any comments from OMB to EPA and any responses to those comments are available for viewing at the Office of Solid Waste docket, Room S-269C, U.S. E.P.A., 401 M St. SW, Washington, D.C. 20460.

President's Task Force on Regulatory Relief

The President's Task Force on Regulatory Relief designated the Consolidated Permit Regulations (40 CFR Parts 122-124) for review by EPA. This proposal supports the goals of the Task force by reducing burden on the regulated community. This proposal also fulfills EPA's obligations in the settlement of industry litigation on the Consolidated Permit Regulations. In addition to settling the litigation, the Agency also plans to:

- Propose other substantive changes to further streamline the Agency's permitting process, and
- Deconsolidate the regulations to make them more easily usable by the public.

As a result of deconsolidation, there will be some reorganization of the regulations. Thus, this proposed amendment may be finalized in a different format and location than it appears in the current regulations and the settlement agreement.

Regulatory Flexibility Act

Under the Regulatory Flexibility Act, 5 U.S.C. 601 *et seq.*, Federal agencies must prepare a regulatory flexibility analysis for all proposed rules to assess their impact on small entities. No regulatory flexibility analysis is required, however, where the head of the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities.

The economic impact of this regulation would be to reduce the costs of complying with EPA's hazardous waste management regulations for owners and operators of hazardous waste management facilities (including those which are small entities). Accordingly, I hereby certify, pursuant to 5 U.S.C. 601(b), that this proposed rule would not have a significant economic impact on a substantial number of small entities.

List of Subjects

40 CFR Part 122

Administrative practice and procedure, Air pollution control, Confidential business information, Hazardous materials, Reporting and recordkeeping requirements, Waste treatment and disposal, Water pollution control, Water supply.

40 CFR Part 123

Confidential business information, Hazardous materials, Indian lands, Intergovernmental relations, Penalties, Reporting and recordkeeping requirements, Waste treatment and disposal, Water pollution control, Water supply.

②

40 CFR Part 264

Hazardous materials, Insurance, packaging and containers, Reporting and recordkeeping requirements, Security measures, Surety bonds, Waste treatment and disposal.

Dated: January 28, 1983.

Anne M. Gorsuch,

Administrator.

END OF ②

③

It is proposed that Title 40 of the Code of Federal Regulations be amended as follows:

PART 122—EPA ADMINISTERED PERMIT PROGRAMS: THE HAZARDOUS WASTE PERMIT PROGRAM

1. The authority citation for Part 122 reads as follows:

Authority: Resource Conservation and Recovery Act, as amended, (RCRA), 42 U.S.C. 6901 *et seq.*; Safe Drinking Water Act, 42 U.S.C. 300f *et seq.*; Clean Water Act, 33 U.S.C. 1251 *et seq.*; Clean Air Act, 42 U.S.C. 1857 *et seq.*

2. Section 122.9 is amended by revising paragraphs (b) and (e) to read as follows:

§ 122.9 Duration of permits.

* * * * *

(b) RCRA. Except as provided in paragraph (e) of this section and § 122.30, RCRA permits shall be effective for the fixed term of the designed operating life of the facility (in the case of an new facility) or the remainder of the designed operating life of the facility (in the case of an existing facility). For land disposal facilities, the term of RCRA permits shall include the post-closure care period or compliance period, whichever is longer, in addition to the designed operating life of the facility. The designed operating life of the facility is the period of time, estimated by the owner or operator and approved by EPA, for which the facility is designed to operate, and during which operation is expected to continue. The estimate should reflect consideration of the construction materials of the facility, the volume and type of waste the facility expects to handle, and the processes the facility will employ.

* * * * *

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(e) The Regional Administrator may issue any NPDES, UIC or 404 permit for a duration that is less than the full allowable term under this section; for RCRA permits only, the Regional Administrator may issue a permit for a duration that is less than the full allowable term under this section only when the permit applicant so requests.

END OF ②

3. Section 122.15 is amended in paragraph (a)(3) by revising the introductory text and paragraph (a)(3)(i)(A) and adding paragraph (a)(7)(ix) to read as follows:

§ 122.15 Modification or revocation and reissuance of permits.

(a) * * *

(3) *New Regulations.* The standards or regulations on which the permit was based have been changed by promulgation of new or amended standards or regulations or by judicial decision after the permit was issued. Permits for RCRA facilities and UIC Class II or III wells may be modified

③

during their terms for this cause without following the conditions of paragraphs (a)(3)(i) and (ii) of this section. All other permits may be modified for this cause only as follows:

(i) For promulgation of amended standards or regulations, when:

(A) The permit condition requested to be modified was based on a

The heading of the Notice supplies some identifying and descriptive information. As shown in Table 2-2, this particular notice has been published by the EPA, the regulations affected by the Notice are identified (40 CFR Parts 122, 123, and 264) and a descriptive title of the programs addressed is provided (Hazardous Waste Management System; the Hazardous Waste . . .). Importantly, the type of Notice is identified; in this case, "Action: Proposed Rule". The type of Notice can always be identified by the phrase next to "Action:" in the heading. Other phrases typically used are:

- Final Rule
- Interim Final Rule
- Proposed Amendments
- Amendments to Final Rule
- Interim Final Amendments

Any phrase used in the heading of a Notice that contains the words Rule or Amendment and does not include the word Proposed, means that the Notice is promulgating a new, or changed, regulation. This is important since all persons affected by the regulation in the Notice will have a finite time period to comply with that regulation and that time period often begins on the date the Notice is published in the Federal Register. Proposed Rules and Amendments are published to inform the public of their content and these types of Notices usually establish a time period during which the public is invited to comment on the Proposed Rules and Amendments.

The preamble of the Notice contains a significant amount of information. It begins with a summary of the action being taken. It will also contain dates, addresses, and contacts for additional information. The major portion of the preamble contains information explaining the purpose and intent of the regulations, why they are written as they are, who or what they are intended to affect, and other information used in support of and as a basis for the regulations. The preamble is always written in "non-regulatory" language and, most importantly, although it explains the intent of the regulatory language, nothing in the preamble carries the force of the law.

As shown in Table 2-2, the preamble will always conclude with the date and name of a high-ranking EPA official. The preamble is then followed by the text of the actual regulations as either proposed or promulgated. This part of the Notice is very important because it contains the regulations as they will read when they become effective after promulgation as a final rule. When promulgated they become part of the Code of Federal Regulations (CFR) and carry the full force of the law.

A discussion of the organization and format of the CFR follows. However, at this point a description of the organization of the Federal Register will assist those who wish to locate any specific Notices pertaining to hazardous waste which have been or will be published.

As mentioned earlier in this discussion, the Federal Register is published every business day, except Federal holidays, throughout the year. All of these daily documents are part of a single "Volume" of the Federal

Register for a specific calendar year. For example, all of the daily issues of the Federal Register published during 1983 are part of the "Volume 48 of the Federal Register". Volume 47 of the Federal Register is comprised of all daily issues of 1982 and so on.

Each volume of the Federal Register is consecutively page numbered and each daily issue receives a consecutive number. This numbering system is most easily explained by reference to the example page from the Federal Register in Table 2-2. Across the top of that reproduced page is the following heading:

"5872 Federal Register/Vol. 48, No. 27/Tuesday, February 8, 1983 Proposed Rules."

That heading indicates that the daily issue of the Federal Register from which that page was copied was published on Tuesday, February 8, 1983; it is the 27th daily issue published in 1983; it is part of Volume 48 (the 1983 volume); it is from the Proposed Rules section of that day's issue; and it is page 5872. The accepted notation for identifying this page for reference purposes is 48FR5872. However, since that notation does not identify which daily issue that page is contained in, the date is often included, i. e., 48FR5872 (2/8/83). The use of this notation is exemplified in footnote 1 at the bottom of the center column in the example Federal Register page.

2.3 THE CODE OF FEDERAL REGULATIONS

The Code of Federal Regulations, often denoted by the acronym CFR, is the compilation of all regulations in effect in the United States. The full text of every regulation promulgated by all Federal government agencies is included in the CFR.

The regulations are grouped under "Titles" in the CFR and each Title is divided into "Chapters". The hazardous waste regulations can be found in "Title 40-Protection of Environment, Chapter I-Environmental Protection Agency". Title 40 is generally identified or annotated as "40 CFR".

Each Chapter of Title 40 is divided into numerous "Parts". Each Part is further divided into "Subparts". The Subparts are comprised of "Sections" and each Section consists of numerous "paragraphs".

"Parts" of 40 CFR are always identified by the word Part followed by a number in Arabic numerals i.e., Part 260. The Parts of a Chapter of a Title are numbered consecutively within the Chapter. Parts are also identified by the notation 40 CFR 260. That notation means "Part 260 of Title 40 of the Code of Federal Regulations." A list of the Parts in Chapter I of Title 40 which deal with hazardous waste are listed in Table 2-3.

Each Part is divided into Subparts. Subparts are identified by the word Subpart followed by an upper case alphabetic character, i.e., Subpart A. The first Subpart of a Part is always "A", the second "B", and so on. There can be as many Subparts as necessary in a Part to properly organize and present informaton.

TABLE 2-3. PARTS OF TITLE 40 OF THE CFR REGARDING PERMITTING AND HAZARDOUS WASTE HANDLING AND DISPOSAL

Part	Title	Notation
260	Hazardous Waste Management System: General	40CFR260
261	Identification and Listing of Hazardous Waste	40CFR261
262	Standards Applicable to Generation of Hazardous Waste	40CFR262
263	Standards Applicable to Transporters of Hazardous Waste	40CFR263
264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities	40CFR264
265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities	40CFR265
266	Reserved	40CFR266
267	Interim Standards for Owners and and Operators of New Hazardous Waste Land Disposal Facilities	40CFR267
270	EPA Administered Permit Programs: The Hazardous Waste Permit Program	40CFR270
271	Requirements for Authorization of State Hazardous Waste Programs	40CFR271
124	Procedures for Decisionmaking	40CFR124

Each Subpart is comprised of Sections which are designated by the symbol "§" followed by a number in Arabic numerals, i.e., §260.135. The number which follows the Section symbol always has a decimal point. The Arabic numerals to the left of the decimal point always identify the Part that the Section is included in and the Arabic numberals to the right of the decimal are a consecutive series within each Part. For example, §264.15 is the fifteenth Section of Part 264 and §264.198 is the one-hundred and ninety-eighth Section of Part 264.

The numbering of Sections within a Part has no correlation to the Subpart in which the Section may appear. For example, §261.30 is the thirtieth Section of Part 261 and appears in Subpart D of Part 261, but §264.30 is the thirtieth Section of Part 264 and it appears in Subpart C of Part 264. As noted above, Sections are numbered consecutively within each Part, beginning, for example, with §260.1 (the first Section of Part 260), and proceeding to as high as §260.999.

Within each Section, each and every paragraph is identified by alphabetic or numeric characters in outline format. The outline format used is:

(a)	lower case alphabetic
(1)	Arabic numerals
(i)	lower case Roman numerals
(A)	upper case alphabetic
(1)	italic Arabic numerals

The outline format is started from the beginning in each Section. The term "Subparagraph" is not used. The designation §260.11(a)(2)(iv) is called paragraph (a)(2)(iv) of Section 260.11. The parentheses are always used in paragraph designation.

In addition to Subparts, a Part may have one or more Appendices. These Appendices are identified by either upper case alphabetic characters or upper case Roman numerals and a title. All Appendices of the Parts listed in Table 3 use upper case Roman numerals, i.e., Appendix I - Representative Sampling Methods (the first Appendix of Part 261). There is no formalized or required organizational format for Appendices of a Part. They are organized internally as best suits the material each contains.

2.4 AVAILABILITY OF COPIES

Applicants may find it useful to refer to copies of the Act (RCRA), the Federal Register (FR), and the Code of Federal Regulations (CFR). These documents are available to the public and readers of this manual are encouraged to obtain them.

One should start by calling the RCRA Hotline in Washington, DC. Guidance is offered as to which documents may be appropriate and which are currently available. Appendix A lists the Hotline number.

Copies of the RCRA might be obtained free of charge through the Regional EPA offices. Appendix A lists the addresses and telephone numbers of the branch of each Regional office which may be able to provide a copy of the Act. As the authority for RCRA has been delegated to each state, the availability of these copies has become increasingly limited.

State agencies may be another source where copies of RCRA may be obtained free of charge. The addresses and telephone numbers of the appropriate agency in each state is given in Appendix A.

Copies of the Act, the Federal Register, and the Code of Federal Regulations may be purchased from the closest Governmental Printing Office (GPO) bookstore. A list of these has been provided in Appendix A. The GPO bookstores are the only available source of the FR and CFR to the public. Should these documents be unavailable through the closest bookstore, they may be ordered through the Superintendant of Documents office in Washington, DC.

In addition to the sources given in Appendix A, there are a variety of locations where copies of these documents may be available. The Regional EPA library should have all documents pertinent to RCRA and many University and Public libraries also have copies of these documents. Many large companies subscribe to the Federal Register and might make copies available to smaller businesses in their area. The current (1983) subscription cost for 1-year of the Federal Register is $300. Subscriptions are available from the GPO in Washington, D.C.

3.0 THE PERMITTING PROCESS

3.1 INTRODUCTION

There are two Parts of Title 40 of the Code of Federal Regulations that contain information on the RCRA permitting process. Part 270 contains information on what an applicant and the EPA must do regarding a permit. That Part contains basic permitting requirements for EPA-administered RCRA programs, such as application requirements, standard permit conditions, and monitoring and reporting requirements. Part 124 establishes the decisionmaking procedures for EPA issuance of RCRA permits. That Part also establishes the procedures for administrative appeals of EPA permit decisions.

This section of the manual presents a simplified description of the major steps that must be taken by both an applicant and the EPA during the RCRA permitting procedure. It also identifies those Parts of Title 40 that are of importance to an owner or operator seeking a RCRA permit.

The overall RCRA permitting process can be summarized into the following steps:

Step 1. The owner or operator of a hazardous waste management facility completes Parts A and B of a RCRA permit application and submits the application to the appropriate EPA office.

Step 2. The EPA reviews the application for completeness. If incomplete, the EPA sends a list of deficiencies, in writing, to the applicant. If complete, the applicant is so informed in writing.

Step 3. When necessary, the applicant prepares and submits the additional information requested.

Step 4. If not done in Step 2, the EPA reviews original and additional submittals and notifies the applicant in writing of the completeness of the application. The date that the EPA makes this notification is the effective date of the application.

Step 5. The EPA reviews the application and either prepares a draft permit or issues a notice of intent to deny the application. In either case, the EPA simultaneously prepares and issues a statement of basis or a fact sheet.

Step 6. The EPA sends copies of the documents in Step 5 to the applicant and others, and simultaneously makes a public notice that they have been prepared. The public notice will provide 45 days for public (or applicant) comment.

Step 7. If at the time of public notice, or at any time during the 45 day comment period, anyone, including the EPA, requests a public hearing, one will be scheduled and announced a minumum of 30 days before the scheduled date.

Step 8. The EPA prepares and issues a final permit decision.

These eight steps are a simplified description. The overall process is presented in more detail in Figure 3-1 and a full description of the steps which EPA must take after receiving a complete RCRA permit application is contained in Subpart A of Part 124 in §§124.3 through 124.21.

3.2 THE PERMIT APPLICATION AND THE PERMIT

The RCRA permit application consists of two parts; a Part A, which is a form requiring completion, and a Part B, which is not a form. This manual is designed to assist applicants in preparing the informational submittal which is the Part B of an application for a RCRA permit.

Part 270 of Title 40 of the CFR provides the informational requirements necessary for a complete RCRA permit application (Part A and Part B). All of the Sections of Subpart B of Part 270 should be read and understood by any owner or operator who is applying for a RCRA permit for the first time.

The actual permit will consist of written approval of the contents of the complete permit application. It will require the applicant to adhere to all statements made in the application and will also include conditions which must be complied with in addition to the application statements. Applicants interested in the types of conditions that may be contained in a permit are referred to §270.30-"Conditions applicable to all permits" and §270.32-"Establishing permit conditions."

3.3 WHERE TO SUBMIT APPLICATIONS

Table 3-1 lists the mailing addresses and the telephone numbers of the EPA offices in each of the ten EPA Regions where permit applications should be submitted. Personnel in these offices should be contacted with any questions that may arise during preparation of a permit application.

Many states have their own hazardous waste permitting program. Their programs may be in addition to or in lieu of the EPA RCRA program. State program offices are listed in Appendix A. Any applicant who is unsure of which agency an application should be submitted to should contact the Regional EPA office (Table 3-1) for clarification.

3.4 CONFIDENTIALITY

An applicant may find it necessary, or may be required, to include confidential information in an application. All applicants are referred to §270.12-"Confidentiality of information" in Subpart B of Part 270. Of particular note are the items in §270.12(b) which cannot be claimed as confidential.

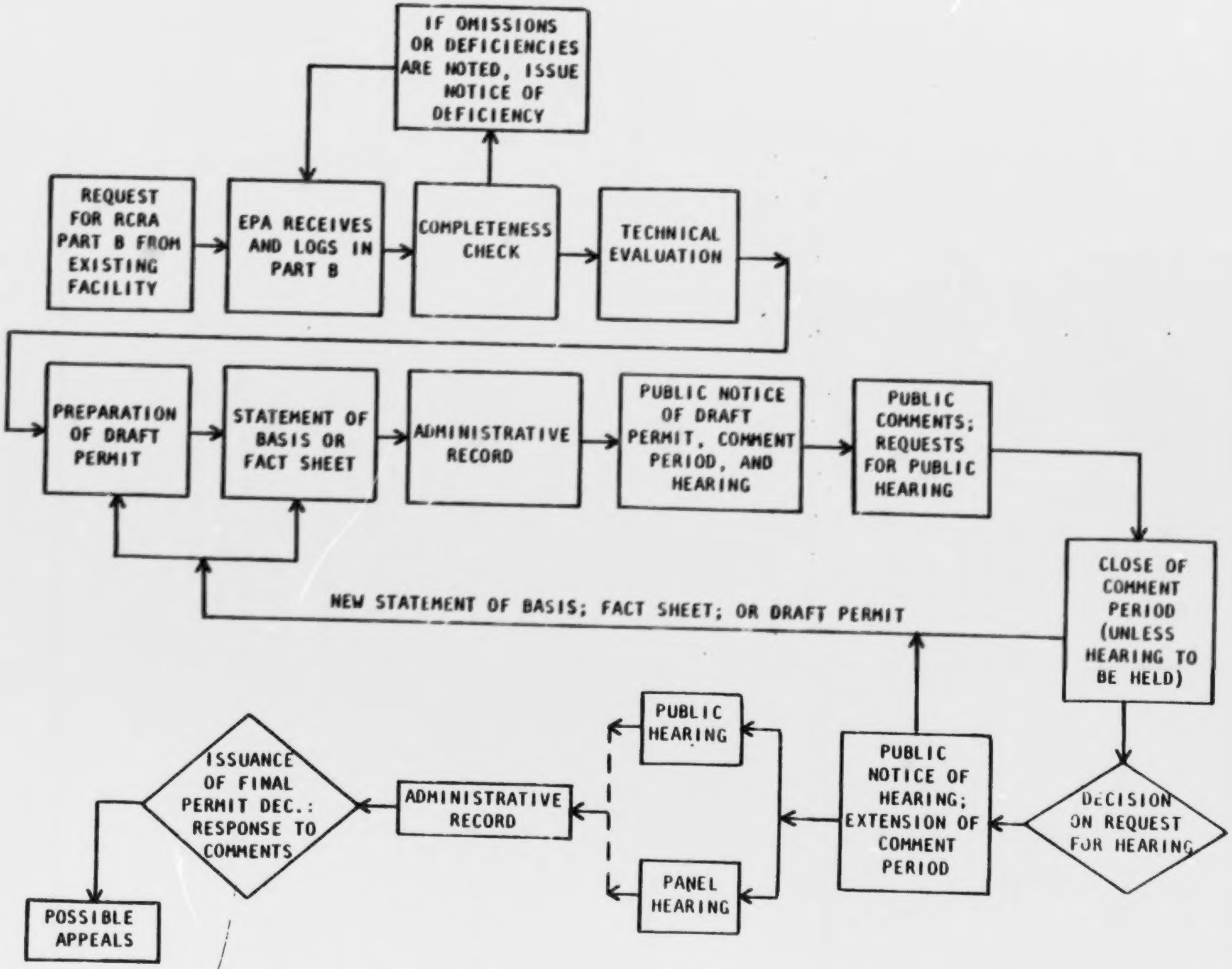
REQUEST FOR RCRA PART B FROM EXISTING FACILITY
EPA RECEIVES AND LOGS IN PART B
IF OMISSIONS OR DEFICIENCIES ARE NOTED, ISSUE NOTICE OF DEFICIENCY
COMPLETENESS CHECK
TECHNICAL EVALUATION
PREPARATION OF DRAFT PERMIT
STATEMENT OF BASIS OR FACT SHEET
ADMINISTRATIVE RECORD
PUBLIC NOTICE OF DRAFT PERMIT, COMMENT PERIOD, AND HEARING
PUBLIC COMMENTS; REQUESTS FOR PUBLIC HEARING
CLOSE OF COMMENT PERIOD (UNLESS HEARING TO BE HELD)
NEW STATEMENT OF BASIS; FACT SHEET; OR DRAFT PERMIT
DECISION ON REQUEST FOR HEARING
PUBLIC NOTICE OF HEARING; EXTENSION OF COMMENT PERIOD
PUBLIC HEARING
PANEL HEARING
ADMINISTRATIVE RECORD
ISSUANCE OF FINAL PERMIT DEC.: RESPONSE TO COMMENTS
POSSIBLE APPEALS

Figure 3-1. Flow diagram of the EPA's RCRA permitting process.

TABLE 3-1. EPA REGIONAL HAZARDOUS WASTE PROGRAM OFFICES

Region I:	OFFICE OF THE DIRECTOR State Waste Programs Branch Waste Management Division John F. Kennedy Federal Building Boston, MA 02203 (617) 223-6883
Region II:	OFFICE OF THE DIRECTOR Solid Waste Branch Air and Waste Management Division 26 Federal Plaza New York, NY 10007 (212) 264-0505
Region III:	OFFICE OF THE DIRECTOR Waste Management Branch/RCRA Permit Section Air and Waste Management Division Curtis Building, 6th and Walnut Streets Philadelphia, PA 19106 (212) 597-9118
Region IV:	OFFICE OF THE DIRECTOR Residuals Management Branch/Waste Engineering Section Air and Waste Management Division 345 Courtland Street NE Atlanta, GA 30308 (404) 881-3433
Region V:	OFFICE OF THE DIRECTOR Waste Management Branch Waste Management Division Federal Building 230 South Dearborn Chicago, IL 60604 (312) 886-7579
Region VI:	OFFICE OF THE DIRECTOR Hazardous Materials Branch Air and Waste Management Division First International Building 1201 Elm Street Dallas, TX 75270 (214) 729-2645

(continued)

TABLE 3-1 (continued)

Region VII:	OFFICE OF THE DIRECTOR Waste Management Branch Air and Waste Management Division 324 East 11th Street Kansas City, MO 64106 (816) 374-6531
Region VIII:	OFFICE OF THE DIRECTOR Waste Management Branch Air and Waste Management Division Suite 900, 1860 Lincoln Street Denver, CO 80203 (303) 837-6238
Region IX:	OFFICE OF THE DIRECTOR Programs Branch Toxics and Waste Management Division 215 Fremont Street San Francisco, CA 94105 (415) 974-7411/974-8391
Region X:	OFFICE OF THE DIRECTOR RCRA Branch Air and Waste Management Division 1200 6th Avenue Seattle, WA 98101 (206) 399-2782

To assert a claim, the provisions of 40 CFR 2 require that the applicant must attach a cover sheet to the information, or stamp or type a notice on each page of the information, or otherwise identify the confidential portions of the application. Words such as "trade secret", "confidential business information", "proprietary", or "company confidential" should be used. The notice should also state whether the applicant desires confidential treatment only until a certain date or a certain event.

Whenever possible, the applicant should separate the information contained in the application into confidential and nonconfidential units and submit them under separate cover letters. Claiming confidentiality for a large portion of the information in the permit application and failing to separate the application into confidential and nonconfidential units may result in significant delays in processing the permit application because the EPA lacks the in-house resources for expeditiously isolating the confidential information from the nonconfidential items.

If it becomes necessary to send confidential information through the mail, the applicant should consider the following precautions in addition to those in §270.12.

1. Place the material in a sealed envelope or container and conspicuously mark that envelope or container as containing confidential information.
2. Place the sealed, marked envelope or container inside an outer envelope or container which is properly addressed but not marked as confidential and seal this outer envelope or container.
3. Mail (or otherwise ship) the material with return receipt (or equivalent) requested.

The EPA is not liable for release of information which an applicant has submitted, but failed to identify as confidential. Additional information on the EPA's handling of confidential information can be found in Part 2 of Title 40 of the CFR.

3.5 APPEALS

It is possible to appeal the contents of a final RCRA permit. The procedure for petitioning the EPA to review any condition of a permit decision is contained in §124.19-"Appeal of RCRA, UIC, and PSD permits." In addition, the EPA can decide on its own initiative to review a final permit. In either case, a petition or decision to review a final permit must be made within 30 days after a RCRA final permit decision has been made under §124.15.

4.0 OVERVIEW OF PARTS 270 AND 264 AND USEFUL INFORMATION SOURCES

4.1 INTRODUCTION

This section provides an overview of Parts 270 and 264 and discusses sources of information that may be useful to the permit applicant. An overview of Parts 270 and 264 is presented because this manual does not provide guidance on all of the information you must develop, compile and submit in Part B of your permit application. The overview identifies what requirements are discussed here and discusses how these relate to other requirements in the regulations. Sources of additional information are provided to identify where you can get answers to specific questions which may arise during application preparation.

The guidance provided later in Section 5.0 is intended to provide you with a discussion and examples of the information content and detail that the Agency expects in your Part B submittal. There is no specific format for Part B, but in some cases, example formats are presented for your consideration. The majority of the discussion has been developed based on research of referenced documents and reports, familiarity with the preamble discussions presented in Federal Register promulgations of these regulations, and extensive discussions with EPA personnel.

4.2 OVERVIEW OF PARTS 270 AND 264

On April 1, 1983, the EPA established, by publication in the Federal Register, Part 270 of Title 40 of the Code of Federal Regulations. That new Part (see 48FR14146, 4/1/83) is titled "EPA Administered Permit Programs: The Hazardous Waste Permit Program". That Part was established to gather all the requirements applicable to RCRA permits into one location in the CFR. Information now contained in Part 270 was scattered throughout Part 122. The April 1, 1983 Federal Register contains a cross-reference index of RCRA related sections in Part 122 that correspond to the new Part 270 sections at 48FR14152.

The regulations in Part 270 present the basic EPA permitting requirements for a RCRA permit. Permit application requirements, standard permit conditions, and monitoring and reporting requirements are all presented in Part 270. Subpart B of Part 270 is titled "Permit Application". The sections in that Subpart identify all the items of information that must be submitted with a permit application. Section 5.0 of this manual focuses on the general information requirements that must be contained in Part B of a permit application. These requirements are contained in §270.14. Additional facility-type specific information requirements are contained in §§270.15 through 270.21.

In addition to the requirements in Part 270, separate technical permitting regulations are stipulated in Part 264. The Part 264 regulations establish minimum Federal standards which define the acceptable management of hazardous waste. The text of Part 270 refers the reader to the sections of Part 264 which contain the standards that a permit applicant must demonstrate compliance with by submittal of information in Part B of a permit application. Section 5.0 of this manual addresses 14 of the required informational items identified in Part 270, identifies the corresponding standards in Part 264, and provides guidance on how to obtain, prepare, and present information required by part 270 that will demonstrate to the EPA that the facility complies with the Part 264 standards.

4.3 INFORMATION SOURCES

4.3.1 Documents/Reports

(a) RCRA Technical Guidance Documents

Each Regional office of the EPA should have available in their library a series of guidance documents which are directly related to the Part 264 regulations governing land based storage, treatment, and disposal facilities. Currently, there are four Technical Guidance Documents available:

(1) "Surface Impoundments - Liner Systems, Final Cover, and Freeboard Control".

(2) "Waste Pile Design - Liner Systems".

(3) "Land Treatment Units".

(4) "Landfill Design - Liner Systems and Final Cover"

These volumes may be ordered from the Government Printing Office, through a local GPO bookstore, or from the Superintendant of Documents Office listed in Appendix A.

The purpose of the Technical Guidance Documents is to present details of design concepts that the EPA believes will satisfy the Part 264 standards (for surface impoundments, waste piles, land treatment units, and landfills). A few contain examples of various unit designs, and as more information is acquired, more models will be included. In all likelihood, a facility meeting these design requirements should qualify for a draft permit.[1]

Appendix B contains a synopsis of each of the Technical Guidance Documents.

(b) Technical Resource Documents (TRDs)

Eight Technical Resource Documents have been developed (as of May 1983) to assist the regulated community and the permitting authorities. In contrast to the Technical Guidance Documents, the TRDs are not directly related to the Part 264 regulations. The current Technical Resource Documents are:

(1) "Evaluating Cover Systems for Solid and Hazardous Waste"
(SW-867); GPO Stock #; 055-000-00228-2.

(2) "Hydrologic Simulation on Solid Waste Disposal"
(SW-868); GPO Stock #; 055-000-00225-8.

(3) "Landfill and Surface Impoundment Performance Evaluation"
(SW-869); GPO Stock #; 055-000-00233-9.

(4) "Lining of Waste Impoundments and Disposal Facilities"
(SW-870); GPO Stock #; 055-000-00231-2.

(5) "Management of Hazardous Waste Leachate"
(SW-871); GPO Stock #; 055-000-00224-0.

(6) "Guide to the Disposal of Chemically Stablilized and Solidified Waste"
(SW-872); GPO Stock #; 055-000-00226-6.

(7) "Closure of Hazardous Waste Surface Impoundments"
(SW-873); GPO Stock #; 055-000-00227-4.

(8) "Hazardous Waste Land Treatment"
(SW-874); GPO Stock #; 055-000-00232-1.

These documents are intended to serve as a resource for the applicant and present the most current state-of-the-art in technologies and methods for evaluating the performance of a disposal facility design. A synopsis of each of the TRDs is presented in Appendix B.

The EPA plans to update these documents to reflect the latest information, and also plans to introduce several new documents dealing with related topics including:

(9) "Evaluation of Closure and Post-Closure Care Plans for Hazardous Waste Landfills".

(10) "Soil Properties, Classification, and Hydraulic Conductivity Testing".

(11) "Solid Waste Leaching Procedure Manual".[2]

(c) Other Guidance Manuals

There exist several other publications which deal with topics specific to land disposal. These are also available from the GPO in the locations given in Appendix A. The other available guidance manuals are:

(1) "Test Methods for Evaluating Solid Wastes" (SW-846)

(2) "A Method for Determing the Compatibility of Hazardous Wastes" (EPA-600/2-80-076)

(3) "Handbook for Remedial Action at Waste Disposal Sites" (EPA-625/6-82-006)

(4) "Permit Writer's Guidance Manual for Subpart F" (Prepared by GeoTrans; currently in draft form)

(5) "Ground-Water Monitoring for Owners and Operators of Interim Status Facilities" (SW-963)

(6) "Financial Assurance for Closure and Post-Closure Care: Requirements for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities - A Guidance Manual" (SW-955)

(7) "Liability Coverage: Requirements for Owners or Operators of Hazardous Waste treatment, Storage, and Disposal Facilities - A Guidance Manual" (SW-961)

(8) RCRA Personnel Training Guidance Manual September 1980 (Updated version available May 1983)

(9) Regional Guidance Manual for Selected Interim Status Requirements - September 22, 1980

(10) Draft Guidance for Subpart G of the Interim Status Standards - October 6, 1981

(11) Draft Guidance for Subpart H of the Interim Status Standards, August 29, 1980

(12) Guidance Manual for Evaluating Permit Applications for the Operation of Hazardous Waste Incineration Units

(13) Guidance Manual for the Closure of Hazardous Waste Surface Impoundments - May 1980

(14) Guidance Document for Subpart F--Ground Water Protection

(15) Guidance Document for Evaluation and Monitoring of Toxic Air Emissions from Land Disposal Facilities

(16) RCRA Inspection Manual[3]

Appendix B also presents a synopsis of some of these documents.

4.3.2 Regional EPA Offices and State Offices

Permit applicants may purchase or study library copies of any of the Technical Resource Documents or the other guidance manuals described in the preceding section. Information regarding these documents, as well as any matter of technical guidance in the RCRA permitting process, is readily available at the EPA Regional offices and the state waste management program offices which are listed in Appendix A, and users of this manual are encouraged to contact them.

4.4 REFERENCES

1. Draft Report: Permit Applicants Guidance Manual for Landfills, Surface Impoundments, Land Treatment and Waste Piles. Prepared by the U.S. EPA. p. 32.

2. *Ibid*. p. 34.

3. *Ibid*. pp. 37-39.

5.0 GUIDANCE FOR PERMIT APPLICATION PREPARATION

This manual is specifically intended to assist permit applicants in addressing the general requirements for a Part B RCRA permit application. Those requirements are all found in §270.14 of Subpart B of Part 270. The permit application information requirements in §270.14 identify the specific Part 264 technical requirements with which an applicant's facility must comply. That compliance must be demonstrated by the information submitted in the Part B application. Table 5-1 shows the Part 270 requirements for which guidance is supplied in this manual and identifies corresponding Part 264 standards for which guidance is also supplied. In addition to the Part 270 requirements identified in Table 5-1, this manual provides guidance relative to the Part 264, Subpart E manifest system, recordkeeping, and reporting requirements. Additional recordkeeping and reporting requirements can be found in §§270.30(j), (1), and 270.31.

In this section of the manual, each of the identified Part 270 requirements is separately addressed. The discussion of each of the requirements includes the wording of the specific regulatory citations, an explanation of the intent of the requirement, and guidance and examples of how applicants can demonstrate compliance with permitting and technical requirements in their RCRA Part B permit applications.

TABLE 5-1. SECTIONS OF PARTS 270 AND 264 ADDRESSED IN THIS MANUAL

Part 270 Sections	Corresponding Part 264 Sections
§270.14(b)(1) Facility Description	None
§270.14(b)(2) Waste Analysis	None specific
§270.14(b)(3) Waste Analysis Plan	§264.13
§270.14(b)(4) Security	§264.14
§270.14(b)(5) Inspection Schedule	§§264.15(b), 264.174, 264,194, 264,226, 264.254, 264.273, 264.303, 264.273(g)
§270.14(b)(6) Preparedness and Prevention	Part 264, Subpart C, §§264.30 through 264.37
§270.14(b)(7) Contingency Plan	Part 264, Subpart D, §§264.50 through 264.56, §264.227 and §264.255
§270.14(b)(8) Prevention Equipment	None specific
§270.14(b)(9) Ignition/Reaction Precautions	§264.17
§270.14(b)(10) Traffic Control	None specific
§270.14(b)(11) Location Information	§264.18
§270.14(b)(12) Personnel Training	§264.16
§270.14(b)(19) Topographic Map	None

5.1 FACILITY DESCRIPTION

5.1.1 Regulatory Citations

A description of the facility must be included with Part B of the permit application, as specified in:

"§270.14(b)(1) A general description of the facility."

Part 264 of the regulations does not specify any regulatory standards with which the facility description must comply.

5.1.2 Guidance to Achieve the Standards

The requirement that a general description of the facility be included in the permit application is straightforward and requires little explanation. The intent is to provide enough information to identify the type and size of facilities for which a permit is being sought. The description can be brief and general. The following is a list of information items which should be considered for mention in the facility description:

- Type of facility (onsite, offsite; storage, treatment, disposal)
- New or existing
- Size (acres, number of units)
- Location
- Name of company
- Name of owner
- Activities conducted
- Wastes types and quantities stored, treated, and/or disposed of

5.1.3 List of Major Points

1. Has a general description of the facility for which a permit is sought been provided?
2. Have the items noted above been addressed?

5.2 CHEMICAL AND PHYSICAL ANALYSES OF HAZARDOUS WASTE

5.2.1 Regulatory Citations

Information on chemical and physical analyses of the hazardous waste to be handled at the facility must be included in Part B of the permit application, as specified in:

> "§270.14(b)(2) Chemical and physical analyses of the hazardous waste to be handled at the facility. At a minimum, these analyses shall contain all the information which must be known to treat, store, or dispose of the wastes properly in accordance with Part 264."

The regulatory requirements regarding chemical and physical analyses of hazardous waste are contained in §264.13. They are:

> "§264.13(a)(1) Before an owner or operator treats, stores, or disposes of any hazardous waste, he must obtain a detailed chemical and physical analysis of a representative sample of the waste. At a minimum, this analysis must contain all the information which must be known to treat, store, or dispose of the waste in accordance with the requirements of this Part or with the conditions of a permit issued under Part 270 and Part 124 of this Chapter.
>
> (2) The analysis may include data developed under Part 261 of this Chapter, and existing published or documented data on the hazardous waste or on hazardous waste generated from similar processes...."

Further, the specific information requirements of §270.14 for several facility types require the owner/operator to document in his application a list of hazardous wastes handled at his facility.

5.2.2 Guidance to Achieve the Part 264 Standards

The concept and objectives of waste analysis are discussed in detail in Section 5.3, Waste Analysis Plans. The essential item to note here, however, is that you must submit the waste analysis data that is necessary to adequately handle each waste at your facility. Sources of this information include analytical data based on analysis of representative samples of the waste, published or historical data, and data provided by waste generators (in the case of offsite facilities). In all likelihood, some combination of these information sources will be required to fully characterize most wastes.

Subsection 5.3.4 discusses the concept of a generator audit which is designed to retrieve generator supplied waste data, witness first-hand the waste generating process, or collect representative waste samples for analysis. It may be appropriate for you to refer to that discussion now if you operate an offsite facility that accepts wastes from several different sources and you intend to rely on data provided by waste generators. In any event, it may be appropriate for you to read all of Section 5.3 before you formulate your response to the information requirements of §270.14(b)(2) in your permit application.

The Part 270 information requirements specify that the submitted hazardous waste analyses must contain the information required to properly treat, store, or dispose of the waste. Thus, analytical parameters must be selected based on waste type, facility type, and management procedure. If a relatively homogeneous waste is stored onsite in tanks, the selected list of waste analysis parameters may not necessarily be as comprehensive as that associated with an offsite treatment facility accepting hazardous inorganic sludges for treatment to render the wastes nonhazardous.

In the first case, the owner/operator would select analytical parameters such as ignitability and reactivity to illustrate that he can safety store the waste and to expedite agreements with an offsite facility that accepts the waste for further storage, treatment, or disposal. The owner/operator would also be concerned with waste/tank compatibility and waste/waste compatibility and would present waste analysis data to assure that compatibility exists.

In the case of the offsite treatment facility, the owner/operator should have sufficient waste analysis data to allow for proper facility operation and assure that the waste is adequately treated and no longer hazardous. Possibly the inorganic waste of concern is a metal plating sludge which demonstrates the EP toxicity characteristic because of high chromium concentration. An applicable treatment process might consist of hydroxide precipitation of chromium, followed by sludge drying and solidification using a cement or pozzolan based stabilization process. The waste characteristics of concern would probably include chromium, other heavy metals, and cyanide (used in alkaline plating baths), which could interfere with reagents used throughout the treatment and stabilization system. Thus, the waste analysis data should include these characteristics.

Regardless of facility type and waste, to fulfill the information requirements of §270.14(b)(2), you should present waste analysis data in tabular form for each waste handled or to be handled at your facility. An example is noted in Table 5-2.

The specific information requirements call for a list of hazardous wastes to be submitted in Part B applications for landfills, surface impoundments, and waste piles. The specific information requirements for land treatment facilities require a listing of wastes to accompany plans for a treatment demonstration. To fulfill the waste listing requirements for these types of facilities, you should indicate the following general information:

- Name of the waste
- EPA hazardous waste ID number (if assigned), and
- Location where the waste will be stored, treated, or disposed of at the facility.

TABLE 5-2. EXAMPLE WASTE ANALYSIS DATA FOR A WASTE RECEIVED AT AN OFFSITE SOLVENT RECOVERY PLANT

Waste No. 346A (EPA ID F002): 1,1,1-trichloroethane from degreasing of cutting tools

Characteristics	Concentration	Comments
1,1,1-trichloroethane	83 ± 5%	More than 40% required to be recoverable
Priority pollutant metals		
Chromium	210 ± 30 mg/l	Metal sludge is centrifuged and landfilled
Copper	650 ± 80	
Lead	40 ± 10	
Nickel	800 ± 100	
Silver	25 ± 5	
Viscosity	0.85 cp	Measured to assure pumpability
Flash point	65°C	Measured for safety in handling
Specific gravity	1.30	Measured to assess separability of phases

If you are also submitting a new or revised Part A application, you are reminded that additional waste analysis information is required in the Part A application to meet the requirements of §270.13. A Part A application must be submitted along with Part B if the facility is new or if the facility is existing and the wastes have changed since the first Part A submittal. The Part A application must include:

- Specification of the hazardous wastes to be stored, treated, or disposed of
- the quantity of wastes to be stored, treated, or disposed of annually at the facility, and
- a general description of processes to be used for such wastes.

5.2.3 List of Major Points

1. If you are submitting a new or revised Part A application, does it include a list of wastes; quantities to be stored, treated, or disposed of on an annual basis; and a general description of the processes used for such wastes?
2. If a new or revised Part A application is being submitted, does all waste analysis data and other waste related information correspond precisely with waste analysis data and information presented in the Part B application?
3. In the Part B application, have you identified all hazardous wastes to be handled and any applicable EPA ID numbers?
4. Most importantly, have you denoted the chemical and physical waste analysis data which must be known to adequately store, treat, or dispose of the wastes at the facility?
5. Have you noted the locations where each waste will be handled at your facility?

To fully address some of these questions and assure that this part of the application is adequate and complete, you should review the guidance in the next subsection on preparation of the waste analysis plan.

5.3 WASTE ANALYSIS PLANS

5.3.1 Regulatory Citations

The information required in the permit application for waste analysis plans is specified under §270.14(b)(3) as follows:

> "A copy of the waste analysis plan required by §264.13(b) and, if applicable §264.13(c)."

The standards specified in §264.13 are applicable to all facilities that treat, store, or dispose of hazardous wastes, and are reprinted below:

> "264.13 General waste analysis.
>
> (a)(1) Before an owner or operator treats, stores, or disposes of any hazardous waste, he must obtain a detailed chemical and physical analysis of a representative sample of the waste. At a minimum, this analysis must contain all the information which must be known to treat, store, or dispose of the waste in accordance with the requirements of this Part or with the conditions of a permit issued under Part 270, and Part 124 of this Chapter.
>
> (2) The analysis may include data developed under Part 261 of this Chapter, and existing published or documented data on the hazardous waste or on hazardous waste generated from similar processes.
>
> (3) The analysis must be repeated as necessary to ensure that it is accurate and up to date. At a minimum, the analysis must be repeated;
>
> (i) When the owner or operator is notified, or has reason to believe, that the process or operation generating the hazardous waste has changed; and
>
> (ii) For offsite facilities, when the results of the inspection required in paragraph (a)(4) of this Section indicate that the hazardous waste received at the facility does not match the waste designated on the accompanying manifest or shipping paper.
>
> (4) The owner or operator of an offsite facility must inspect and, if necessary, analyze each hazardous waste movement received at the facility to determine whether it matches the identity of the waste specified on the accompanying manifest or shipping paper.
>
> (b) The owner or operator must develop and follow a written waste analysis plan which describes the procedures which he will carry out to comply with paragraph (a) of this Section. He must keep this plan at the facility. At a minimum, the plan must specify:
>
> (1) The parameters for which each hazardous waste will be analyzed and the rationale for the selection of these parameters (i.e., how analysis for these parameters will provide sufficient information on the waste's properties to comply with paragraph (a) of this Section;
>
> (2) The test methods which will be used to test for these parameters;

(3) The sampling method which will be used to obtain a representative sample of the waste to be analyzed. A representative sample may be obtained using either:

(i) One of the sampling methods described in Appendix I of Part 261 of this Chapter; or

(ii) An equivalent sampling method.

(4) The frequency with which the initial analysis of the waste will be reviewed or repeated to ensure that the analysis is accurate and up to date; and

(5) For offsite facilities, the waste analyses that hazardous waste generators have agreed to supply.

(6) Where applicable, the methods which will be used to meet the additional waste analysis requirements for specific waste management methods as specified in §264.17 and 264.341.

(c) For offsite facilities, the waste analysis plan required in paragraph (b) of this Section must also specify the procedures which will be used to inspect and, if necessary, analyze each movement of hazardous waste received at the facility to ensure that it matches the identity of the waste designated on the accompanying manifest or shipping paper. At a minimum, the plan must describe:

(1) The procedures which will be used to determine the identity of each movement of waste managed at the facility; and

(2) The sampling method which will be used to obtain a representative sample of the waste to be identified, if the identification method includes sampling.

5.3.2 Guidance to Achieve the Part 264 Standards

In response to public comment, the standards of §264.13 were stated in somewhat general terms to be comprehensive enough to account for the variety of conditions and waste analysis requirements which arise from site to site.[1] The requirements for waste analysis that each owner/operator will have to meet will be specified in the facility permit after administrative and technical review of the permit application. The scope of the waste analysis plan is expected to differ significantly from site to site, so that the owner/operator must successfully demonstrate through his proposed procedures that the intent of the §264.13 waste analysis requirements are met and that the specific requirements for his facility type (Subparts I through N) are also supported. Waste analysis is implicitly required in those Subparts to comply with waste related standards for these different types of treatment, storage, and disposal facilities. In essence, the objective of the waste analysis plan is to assure successful treatment, storage, or disposal of wastes at the facility through recognition and implementation of specific waste analysis procedures selected based on waste type, facility type, and waste management procedures.

In providing the information to meet this permitting requirement, the applicant should rigorously consider what he is doing with the waste at his facility to formulate an appropriate plan of sampling and analysis. The applicant should view this plan as essential to successful and safe operation of the facility, as opposed to a regulatory requirement to generate analytical data for simple recordkeeping purposes. A well designed comprehensive waste analysis plan will help the owner/operator prevent adverse incidents and the expense of associated cleanup or litigation.

An acceptable waste analysis plan must encompass the following aspects for all facilities:

- Procedures and methods for obtaining waste analysis data to assure that the wastes can be successfully treated, stored, or disposed of.
- Methods of collecting representative samples.
- Procedures for reviewing or repeating the initial analysis of the waste on a routine and as-needed basis.
- Quality assurance/quality control for waste sampling and analysis in all phases.
- Procedures and methods of waste analysis for characterizing incompatible, ignitable, and reactive wastes, as well as methods to show that such wastes have been rendered compatible, nonignitable, or nonreactive.

Additionally, the waste analysis plan must incorporate procedures and methods to support waste analysis requirements associated with specific onsite and offsite facility types (containers, tanks, waste piles, surface impoundments, land treatment facilities, and landfills) and specific waste management procedures (treatment, storage, or disposal). Some of these added requirements for offsite facilities include:

- Procedures to inspect and, if necessary, analyze each movement of waste received to ensure consistency with the manifest form.
- Procedures for documenting that the received waste is as expected from each particular waste generator within established tolerance bands.
- Procedures for resampling, reanalyzing, and accepting or rejecting received wastes.

Additional procedures that must be represented for yet other types of facilities include:

- Methods of characterizing or analyzing existing wastes in waste receiving facilities to assure compatibility with incoming waste.
- Methods of waste analysis to assure compatibility of wastes with equipment surfaces, facility liners, and leachate collection system materials.
- Methods of determining that storage facilities and equipment are decontaminated at closure.

- Methods to determine the presence of liquids or free liquids.
- Methods of determining whether collected leaks, spills, run-off, or leachate are hazardous or nonhazardous.

The remainder of this section presents guidance on achieving the general standards for waste analysis specified in §264.13 and for achieving the facility specific standards (Subparts I through N) which implicitly require waste analysis. Examples are provided in Section 5.3.6 to illustrate the type of information that an owner/operator should incorporate in his waste analysis plan.

The Environmental Protection Agency is preparing a Waste Analysis Plan Guidance Manual (draft expected in Spring 1984) which will provide detailed guidance on waste analysis plans for all types of facilities. That document is intended to supplement the concepts and guidance presented in this manual and will include model waste analysis plans for a wide variety of different facility types.

5.3.3 Guidance for Preparation of Waste Analysis Plans for All Facilities

Waste analysis requirements will differ depending on the type of facility, type of waste, and specific waste management practices. However, certain aspects of the general waste analysis requirements are common to all facilities and waste types.

5.3.3.1 Analysis of Wastes to be Treated, Stored, or Disposed Of--

Waste analysis is required to ascertain that wastes can be successfully treated, stored, or disposed of. This waste analysis can be based on analysis of representative waste samples or on historical or available scientific data. Except for simple cases, it is expected that both types of documentation will be necessary.

Analytical parameters must be selected based on waste type, facility type, and management procedure. If a relatively homogeneous waste is stored onsite in tanks, the list of parameters selected for analysis will be much less comprehensive than that associated with an offsite treatment facility accepting hazardous inorganic sludges to be rendered nonhazardous. In the first case, the owner/operator would select analytical parameters such as ignitability and reactivity to allow for safe storage and to expedite agreements with an offsite facility that would later accept the waste for further storage, treatment, or disposal. In this case, the owner/operator would also be concerned with waste/tank compatibility and waste/waste compatibility and would select analytical parameters to assure that compatibility exists.

In the second case, in addition to recognizing issues of waste compatibility and safety in handling, the owner/operator of the offsite treatment facility would need to select waste analysis parameters sufficient to allow for adequate treatment of the waste to assure that it is no longer hazardous. Suppose that the inorganic waste of concern is generated by production of titanium oxide pigment and demonstrates the EP toxicity characteristic because of high concentrations of heavy metals. Such a waste might also be contaminated with cyanide. An applicable treatment process might consist of chemical oxidation of cyanide followed by hydroxide precipitation of heavy metals. Ultimately, the resulting sludge might be dried and solidified or otherwise stabilized. In this instance, the owner/operator's waste analysis plan should specify analytical parameters for the waste feed, treated stabilized waste product, and intermediate streams in the treatment process. The waste feed analytical parameters might include pH, cyanide, a variety of specific heavy metals, total solids, and others to assure proper treatment. Other constituents that are incorporated in the waste which could interfere with reagents used throughout the treatment and stabilization system might also be designated for analysis. The stabilized product could conceivably be subjected to the EP toxicity test and leachate analyzed for heavy metals and metal cyanides to document that the stabilized waste is no longer hazardous.

Other examples are provided in later sections. The point to be made here is that there is no universal set of parameters to be analyzed for. The parameters selected will be strongly site and waste specific. Therefore, the applicant must carefully evaluate and present a rationale for selection of waste analysis parameters in all cases.

5.3.3.2 Procedures for Collecting Representative Samples--

Regardless of the purpose of the analysis, the applicant must demonstrate his procedures for collecting representative samples for analysis. These procedures will depend on the nature of the waste, its variability over time, and the waste generating process. Samples are representative if they allow for accurate and precise quantification of the average characteristics of the waste. An accurate sample is one which will provide a measured value close to the true value. A precise sample is one which will provide a measured value close to the measured value of other replicate samples. In-depth discussion of representative sampling procedures is provided in SW-846--Test Methods for Evaluating Solid Wastes.[2] The applicant should obtain a copy of that document (see Appendix A for locations where it is available) because of its comprehensive treatment of waste sampling and analysis and because much of the discussion and guidance in this document is based on its contents. In addition to SW-846, other reference sources of value in understanding representative sample collection procedures for hazardous waste include:

- Ford, P. J., P. J. Turina, and D. E. Seely. Characterization of Hazardous Waste Sites - A Methods Manual. Volume II - Available Sampling Methods. Prepared for Lockheed Engineering and Management Services under EPA Contract No. 68-03-3050. Environmental Monitoring Systems Laboratory, Office of Research and Development, U.S. Environmental Protection Agency. March 1983.[3]

- U.S. Environmental Protection Agency. Samplers and Sampling Procedures for Hazardous Waste Streams. U.S. EPA Municipal Environmental Research Laboratory. Cincinnati, Ohio. FPA-600/2-80-018.[4]

Further, 40 CFR 261 Appendix I lists certain ASTM standard methods for collecting representative samples, as follows:

> "Extremely viscous liquid--ASTM Standard D140-70, Crushed or powdered material--ASTM Standard D346-75, Soil or rock-like material--ASTM Standard D420-69, Soil-like material--ASTM Standard D1452-65
>
> Fly ash-like material--ASTM Standard D2234-76 (ASTM Standards are available from ASTM, 1916 Race St., Philadelphia, PA 19103).
>
> Containerized liquid wastes--'COLIWASA' described in [SW-846].
>
> Liquid waste in pits, ponds, lagoons, and similar reservoirs--'Pond Sampler' described in [SW-846]."

5.3.3.2.1 Statistical Concepts Used in Collecting Representative Samples--Statistical techniques must be used to collect accurate and precise samples. Your waste analysis plan should be clear and specific with regard to this issue because statistical sampling techniques are not always simple to implement in spite of the fact that they are fairly clear to understand.

Sampling accuracy is usually achieved by some form of random sampling. This is particularly true for sampling of heterogeneous wastes. In random sampling, every unit in the population has a theoretically equal chance of being sampled and measured. Consequently, statistics generated (mean, standard deviation) by analyzing the sample are accurate estimators of the true population parameters, i.e., the sample is representative of the population. One method of selecting a random sample is to divide the population by an imaginary grid, assign a series of consecutive numbers to the units of the grid, and select the numbers (units) to be sampled through the use of a random numbers table. Note that a haphazardly selected sample is not a suitable substitute for a randomly selected sample. Samples collected in other than a random fashion may be skewed because of sampling bias; for instance by the collection of the most easily accessible samples.

Sampling precision is most commonly achieved by taking an appropriate number of samples from the population. Sampling precision can be increased by maximizing the physical size (weight or volume) of the samples. Increasing the number or size of samples taken from a population, in addition to increasing sampling precision, has the secondary effect of increasing sampling accuracy.

More complex stratified random sampling is appropriate if a waste is known to be randomly heterogeneous in terms of its chemical properties and/or nonrandom chemical heterogeneity is known to exist from batch to batch. In such cases, the population should be stratified during sampling to isolate the known sources of nonrandom chemical heterogeneity. After stratification, which may occur over space and/or time, the units in each stratum are numerically identified, and a simple random sample is taken from each stratum. The advantage of stratified random sampling over simple random sampling is that, for a given number of samples and a given sample size, the former technique often results in a more precise estimate of chemical properties of a waste than the latter technique. However, greater precision is likely to be realized only if a waste exhibits substantial nonrandom chemical heterogeneity and stratification efficiently "divides" the waste into strata that exhibit maximum between-strata variability and minimum within-strata variability. If that does not occur, stratified random sampling can lead to analytical results that are less precise than those which result from simple random sampling. Therefore, it is reasonable to select stratified random sampling over simple random sampling only if the distribution of chemical contaminants in a waste is sufficiently known to allow an intelligent identification of strata and at least two or three samples can be collected in each stratum.

Another type of probability sampling is systematic random sampling, in which the first unit to be collected from a population is randomly selected, but all subsequent units are taken at fixed space or time intervals. An example of systematic random sampling is the sampling of a movement of drums received at an offsite facility wherein the first drum sampled is selected on a random basis and every fourth drum is sampled thereafter. The advantages of systematic random sampling over simple random sampling and stratified random sampling are the ease in which samples are identified and collected. One disadvantage of systematic random sampling is the inaccuracy that may result if trends or cycles in waste variability are not recognized and they coincide with the sampling routine.

The foregoing statistical sampling techniques are contrasted with authoritative sampling, in which an individual who has knowledge of the solid waste to be sampled selects a sampling scheme using his own judgement. The validity of data gathered is completely dependent on the knowledge of the sampler and although valid data can sometimes be obtained, authoritative sampling is not recommended for characterization of most wastes.

To summarize, if little or no information is available concerning the distribution of chemical contaminants of a waste, simple random sampling is the most appropriate sampling strategy. As more information is accumulated for the wastes and contaminants of concern, consideration can be given to stratified random sampling, systematic random sampling, and, perhaps, authoritative sampling.

Test Methods for Evaluating Solid Waste (SW-846) provides much more detail on representative sampling procedures and sampling strategies. Hypothetical examples are provided to illustrate statistical procedures used in designing sampling strategies.

5.3.3.2.2 Grab and Composite Samples[2,3]--A grab sample is defined as a discrete aliquot representative of a specific location at a given point in time. The sample is collected in its entirety at one point in the sample medium. The representativeness of such samples is defined by the nature of the materials being sampled. In general, as sources vary over time and distance, the representativeness of grab samples will decrease.

Composite samples are nondiscrete samples composed of more than one specific aliquot collected at various sampling locations and/or different points in time. Analysis of this type of sample produces an average value and in certain instances is a viable alternative to analyzing a number of individual grab samples and calculating an average value. It should be noted, however, that compositing can mask low concentrations of constituents that may exist in samples taken at specific locations or times.

For sampling situations involving hazardous wastes, grab sampling techniques are generally preferred because grab sampling minimizes the amount of time sampling personnel must be in contact with the wastes, reduces risks associated with compositing unknowns, and eliminates chemical changes that might occur due to compositing. Compositing, however, may be used for hazardous samples under certain conditions. For example, compositing of hazardous waste is often performed (after compatibility tests have been completed) to determine an average value over a number of different locations such as a group of drums. This procedure provides data that can be useful by providing an average concentration within a number of units, can help keep analytical costs down, and can provide information useful to the owner/operator.

Some valuable insight on composite sampling is provided in a study prepared for EPA Region I by A. T. Kearney, Inc.[5] The report points out the disadvantages of composite samples by first noting the natural heterogeneity of hazardous wastes and then by reference to measurement of waste ignitability, corrosivity, reactivity, and EP-toxicity. With respect to ignitability, it is noted that otherwise ignitable wastes such as waste ether or acetone may be rendered nonignitable if mixed (i.e., composited) with a sufficient quantity of aqueous waste. Corrosive wastes are generally either strongly caustic or acidic. Clearly, compositing diverse, otherwise corrosive wastes may result in a neutral, noncorrosive composite waste, analysis of which will not indicate the corrosive wastes which may exist in the waste population. Additionally, compositing of reactive hazardous wastes must be avoided to prevent generation of toxic gases or fumes. Further, if several dissimilar wastes are composited, dilution effects may result in a waste sample which does not exhibit EP-toxicity, despite the possibility that individual samples and associated wastes may be EP-toxic. In summary, complicating factors which must be considered in compositing samples include neutralization upon compositing, precipitation of hazardous constituents, reactions or explosions, waste dilution, and other phenomena.

Although analysis of discrete or grab samples is superior to composite samples in assuring measurement of representative waste characteristics, the disadvantages of cost and time must be considered in selecting sampling procedures.

5.3.3.2.3 Multiple Samples[3]--The concept of multiple samples is applicable to both grab and composite samples. It is recommended that multiple samples be collected whenever possible. They are essential for quality control and they assist in reducing costs associated with resampling as a result of container breakage or errors in the analytical procedure. Multiple samples include duplicates, blanks, split samples, or spiked samples.

Duplicate samples are identical samples collected at the same time in the same way, and contained, preserved, and transported in the same manner. These samples are often used to verify the sampling precision. Sample blanks are samples of deionized/distilled water, rinsed collection devices or containers, sampling media (e.g., sorbent), etc. that are handled in the same manner as the sample and subsequently analyzed to identify possible sources of contamination during collection, preservation, handling, or transport. Split samples are those collected in duplicate fashion for the purpose of separate analysis. Spiked samples are duplicate samples that have a known amount of a substance of interest added to them. These samples are used to corroborate the accuracy of the analytical technique and could be used as an indicator of sample quality change during shipment to the laboratory.

5.3.3.2.4 Applicable Hazardous Waste Sampling Equipment--Sampling of various types of hazardous wastes requires a variety of sampling equipment. Although much of the applicable sampling equipment is commercially available, some may have to be custom made for a given sampling routine. Table 5-3, from SW-846, provides a summary of sampling equipment which may be used for different classifications of waste.

5.3.3.3 Quality Assurance/Quality Control--

As noted in SW-846, Section Ten (incorporated here in Appendix F):

> "Quality assurance (QA) is a system for ensuring that all information, data, and resulting decisions compiled under a specific task are technically sound, statistically valid, and properly documented. Quality control is the mechanism through which quality assurance achieves its goals. Quality control programs define the frequency and methods of checks, audits, and reviews necessary to identify problems and dictate corrective action, thus verifying product quality.

The facility's implemented QA/QC program will determine the accuracy, precision, and overall integrity of the sampling and analysis program. An incomplete, unsound, or poorly planned QA/QC program will be judged deficient during review of your permit application. Therefore, if an outside laboratory is contracted, the applicant should carefully review their current QA/QC program. Similarly, the applicant should review and augment his own QA/QC procedures, if the owner/operator plans to conduct all necessary sampling and analyses with his own resources.

As noted in SW-846, an acceptable QA/QC plan will denote:

"1. The intended use(s) for the data, and the necessary level of precision and accuracy of the data for these intended uses.

"2. A representative sampling plan that includes provisions for:

- selecting appropriate sampling locations, depths, etc.
- providing a statistically sufficient number of sampling sites.
- measuring all necessary ancillary data.
- determining which media are to be sampled (e.g., solid, liquid, sludge).

TABLE 5-3. SAMPLING EQUIPMENT FOR PARTICULAR WASTE TYPES

Source: Reference 2 (SW-846).

	Waste location or container								
Waste type	Drum	Sacks and bags	Open bed truck	Closed bed truck	Storage tanks or bins	Waste piles	Ponds, lagoons, & pits	Conveyor belt	Pipe
Free flowing liquids and slurries	COLIWASA	N/A	N/A	COLIWASA	Weighted bottle	N/A	Dipper	N/A	Dipper
Sludges	Trier	N/A	Trier	Trier	Trier	[a]	[a]		
Moist powders or granules	Trier	Trier	Trier	Trier	Trier	Trier	Trier	Shovel	Dipper
Dry powders or granules	Thief	Thief	Thief	Thief	Thief	Thief	Thief	Shovel	Dipper
Sand or packed powders and granules	Auger	Auger	Auger	Auger	[a]	[a]	[a]	Dipper	Dipper
Large grained solids	Large Trier	Large Trier	Large Trier	Large Trier	Large Trier	Large Trier	Large Trier	Trier	Dipper

[a] This type of sampling situation can present significant logistical sampling problems. Therefore sampling equipment must be specifically selected or designed based on site and waste conditions.

- determining which parameters are to be measured (and where).
- selecting appropriate sample containers.
- selecting the frequency of sampling and length of sampling period.
- selecting the types of sample (e.g., composites vs. grabs) to be collected.
- sample preservation procedures.
- chain-of-custody.

"3. An analytical plan that includes:

- chain-of-custody procedures.
- appropriate sample preparation methods.
- appropriate analytical methods.
- appropriate calibration and analytical procedures.
- procedures for data handling, review and reporting.

"4. Planning for the inclusion of proper and sufficient QA/QC activities, including the use of QC samples throughout all phases of sampling and analysis to ensure that the level of quality of the data will meet the requirements of the intended use(s) of the data."

Further more detailed guidance is provided in Section 10 of SW-846 as reported here in Appendix F.

5.3.3.4 Procedures for Reviewing or Repeating the Initial Analysis of the Wastes--

The applicant should develop a scheme for reviewing or repeating the initial analysis of the wastes during facility operation on a routine basis and on an as-needed basis. Waste characteristics will vary depending on the nature of the waste generating process. For instance, the process may operate using different feedstocks at different times of the year (e.g. petroleum distillation bottoms) and may incorporate different downstream processing components or additives as a consequence of the change in feedstock. Thus, the applicant should actively account for these routine changes in the generated waste by incorporating intermittent reanalysis of the waste into his waste analysis plan.

In addition, the owner/operator should develop a plan to reanalyze wastes on a contingent basis if he suspects that the waste characteristics have changed. Such contingent reanalysis might be signaled as a result of visual inspection during handling, as a result of measured changes in waste treatability, or as a result of incidents during handling such as fume

3 generation. Additionally, wastes should be reanalyzed if a generator notifies the owner/operator that the waste generating process has changed or if he knows of a specific change in the waste. The applicant's waste analysis plan must propose criteria and schedules for reanalysis and must specify the parameters to be analyzed during recharacterization of the waste in each instance.

5.3.4 Guidance for Preparation of Waste Analysis Plans for Offsite Facilities

This subgroup of facilities is addressed next because requirements for waste analysis plans for offsite facilities are incorporated in the general waste analysis requirements of §264.13. Offsite facilities are those storage, treatment, and disposal facilities which accept waste from remote generator locations after waste transport. Offsite facilities are required to:

- document the waste analysis data that generators have agreed to supply; and
- specify procedures to inspect and, if necessary, analyze each movement of waste received to assure consistency with the manifest form.

The remainder of this subsection presents guidance on meeting these requirements and discusses applicable methods to assure that received wastes are as expected from particular waste generators and methods to screen for restricted wastes.

5.3.4.1 Waste Analysis Data Provided by Generators--

It is the owner/operator's responsibility to obtain waste analysis data for all wastes to be received at his facility. Although the generator can not be forced to provide waste analysis data, the owner/operator can request it. Additionally, the owner/operator can not be prevented from charging the waste generator for the full cost of handling his waste which would include the cost of analyzing the waste. The most prudent waste generators will provide accurate analytical data in recognition of this fact and frequently as a result of having previously generated this information for purposes of safely storing the wastes onsite prior to transport to the offsite facility.

In formulating and implementing the waste analysis plan for an offsite facility, the preliminary work and agreements between the owner/operator and generator will be the key to success. The owner/operator should consider the nature of a potential customer's waste, the variability of that waste, the chance that other waste components could be inadvertently or otherwise mixed in the expected waste, and the chance of errors during shipment of the waste from the generator's plant. To guard against the adversities associated with errors or intentional changes in the waste, the owner/operator should do the following during early negotiations with waste generators:

- request representative waste samples for testing;
- request as much data as exists on the waste stream, including expected quantities, processes generating the waste, waste

classification, specific waste characteristics, known health or environmental effects of the waste, and known hazards in handling or disposing of the wastes;

- ask the generator how he proposes to assure that the waste shipped will be as specified in the original contract; and
- visit the generating facility to gain first hand knowledge of the waste generating process, other waste materials onsite which could potentially be mixed with the contracted waste, and the chances for error in waste shipment.

It is recommended that requests for waste analysis data from the generator be formalized by use of a standard and detailed questionnaire developed by the owner/operator. Additionally, if the owner/operator proposes to use such a questionnaire, its incorporation in this part of the application will expedite the permit review process. If the owner/operator has not yet produced such a form, he should consider requesting the following types of information, subject to the type of storage, treatment, or disposal that he proposes.

- Generator name, address, and company representative;
- waste name, industry or EPA hazardous waste number, and process generating waste;
- waste analysis data, such as:
  - pH
  - physical state
  - liquids or solids content
  - specific gravity
  - flash point
- specific waste components, such as:
  - specific organic compounds
  - specific inorganic compounds
  - heavy metals

The form might also request the generator to provide a general ranking of the waste in terms of its reactivity or ignitability. Additionally, if the generator knows of specific wastes that are incompatible with the candidate waste, he should be asked to list them. In essence, the generator should be requested to provide any information possible to promote successful handling of the candidate waste.

5.3.4.2 Generator Audits--

Waste analysis is of utmost importance to successful operation of an offsite facility. In addition to requesting the generator to supply waste analysis data or representative samples for analysis, it is recommended that the facility owner/operator conduct an "audit" of the waste generator's facility. A generator audit is possibly one of the most thorough and rigorous methods of obtaining knowledge of the candidate waste and its potential variability. The audit should be formulated to allow the owner/operator to inspect the waste generating process and plant and to independently assess potential variability of the waste stream and chances for errors or inconsistencies in shipment. The owner/operator should consider the results of the audit in defining the stringency of contracts (i.e., allowable tolerances for given waste characteristics) or other formal agreements made with the generator. Although the scope of the audit will depend on the waste generating process and offsite facility design and operation, a list of applicable information which should be retrieved during an audit is presented below:

- Characterization of the waste generating process, including
  - types and quantities (batch or rate) of raw materials, catalysts, and reagents
  - processing information such as operating parameters and schedules
  - contingency operating plans or use of other hazardous or nonhazardous materials which generate other hazardous components in the waste product
  - routine variations in process operation
- Characterization of the waste
  - average rate of production and variability of rate
  - storage time onsite before shipment
  - controlled or uncontrolled changes to waste during storage
  - method of waste shipment and provisions for access to samples upon receipt at offsite facility
  - all known waste analysis data or sources of data
  - previous history of waste handling and any remarkable incidents
- Characterization of other influencing factors at the plant
  - other sources of waste which could be intentionally or accidently mixed with the intended waste product

- adequacy of procedures currently used to manage other wastes generated onsite

- practices currently implemented to avoid cross-contamination

As part of the audit, representative samples should be collected and analyzed. For best results, replicate samples should also be collected and the number of replicates should be determined based on expected waste variability.

5.3.4.3 Agreements Between Owner/Operator and Generator--

Once the question of waste variability has been answered by means of sample analysis, the generator audit, or by acquisition of historical or published data, the affects of such variability on offsite facility operation must be evaluated. The magnitude of these impacts will depend on the constituents which vary, the range of variability, and the design and operation of the facility. The range of potential effects to be considered will expand with the complexity of the facility.

Tolerance limits should be specified for measured waste components that may adversely affect plant operation. These parameters or suitable indicator parameters should then be considered for analysis upon receipt of each movement of waste from that particular generator. Agreements made between the generator and owner/operator should specify allowable tolerances for accepting the transported waste. Additionally, the agreement should specify the steps to be taken when the results of waste analysis at receipt indicate waste characteristics outside allowable tolerances. For instance, procedures for resampling and reanalyzing the waste, contacting the generator, or rejecting waste shipments should be specified in the agreement and in the waste analysis plan.

5.3.4.4 Characterization of Each Movement of Waste--

The waste analysis plan must address each movement of waste received at your facility to assure consistency between the manifest information and the waste movement; to assure that the waste you receive from a particular generator is the waste that you expect to receive, and to assure that you detect restricted wastes. In the first case, inconsistencies between waste and manifest information may arise because of accidental or intentional mixups. Since a waste movement could contain a significant amount of waste units (e.g., a flat bed truck carrying drums), the question arises as to the proportion of the waste which should be somehow screened to determine consistency of waste and manifest information.

Wastes are typically nonhomogeneous. Additionally, waste streams at a given generator location may be inadvertantly or intentionally mixed, thus causing further uncertainty in waste characteristics. Therefore, each movement of waste must be subjected to some degree of waste analysis to verify that it possesses the characteristics that the waste from that particular generator is expected to possess. Therefore, the concept of "fingerprint analyses" is introduced in this section.

You may have decided to restrict certain wastes or waste constituents from your facility. In all likelihood, those which may have been selected for restriction typically exist in small concentrations or may be easily masked by mixing in other wastes. Guidance is provided here to help plan for screening to detect restricted wastes.

5.3.4.4.1 Screening to Determine Consistency of Waste and Manifest Information--One of the most important aspects of waste analysis at offsite facilities is the need to characterize each movement of waste to assure that the information provided on the waste manifest correctly identifies the waste. The questions of most concern are the amount of sampling which must be done and the inspections or analyses which should be conducted to assure that these goals are achieved for each waste movement.

The previously noted report by A. T. Kearney[5] provides perspective on this issue. They report the results of a telephone survey conducted by Mittelhauser Corporation to characterize sampling procedures used by treatment, storage, and disposal facilities. A summary of the responses received from 10 sites is discussed below.

Each facility sampled every shipment of waste received, and in fact, the majority of facilities sampled every drum and bulk shipment received. One site samples 1 to 5 or more drums from each shipment depending on the total number of drums. Another site whose policy was to sample only 10 percent of incoming waste indicated that 100 percent of the waste would be sampled starting in 1983. The purpose noted was to provide more safety in handling and assure successful treatment in new treatment processes.

The facilities noted that analytical parameters selected are heavily dependent on the type of waste and the available waste treatment process. Some representative parameters included TOC, pH, heavy metals, and solids concentration. To assess consistency between waste and manifest you should consider visually inspecting the wastes for physical state, phase separation, texture, color, and odor. Applicable analytical procedures that may be informative include pH and specific gravity.

The A. T. Kearney report[5] provides further perspective on the advantages of sampling 100 percent of the wastes in question. Clearly, any time less than 100 percent of all wastes are sampled (for instance, less than all of the drums in a single waste movement), there is a finite probability that the unsampled waste is different than expected, different from manifest documentation, and/or different from the sampled wastes. In the context of drum sampling at offsite facilities, the report provides tabulated statistics to determine the number of drums which must be sampled to estimate p, the proportion correct (i.e., consistent with the manifest), with a confidence level of A percent and an error bound of B percent assuming that an estimate of the actual number correct, C, is known based on historical information. The statistics ignore waste lot size (a method of correcting for waste lot size is discussed below) and are reproduced here in Table 5-4 for the conditions of 95 percent correct and 99 percent correct. These percentages correct are selected for the purposes of discussion only.

TABLE 5-4. SAMPLE SIZE REQUIREMENTS FOR IDENTIFICATION OF WASTE MOVEMENTS
Source: Reference 5.

Required Sample Size When
Proportion Correct (C) = 95%

A (Confidence Level)	B (Bound on Error) 10%	9%	8%	7%	6%	5%
95%	18	22	28	37	51	73
96%	20	25	31	41	56	80
97%	22	28	35	46	62	89
98%	26	32	40	53	72	103
99%	31	39	49	64	87	126

Required Sample Size When
Proportion Correct (C) = 99%

A (Confidence Level)	B (Bound on Error) 10%	9%	8%	7%	6%	5%	4%	3%	2%
95%	4	5	6	8	11	15	24	42	95
96%	4	5	6	8	12	17	26	46	104
97%	5	6	7	9	13	19	29	52	116
98%	5	7	8	11	15	22	34	60	134
99%	7	8	10	13	18	26	41	73	164

The data presented in the table serve to illustrate the degree of certainty sacrificed if a decision is made to sample and analyze less than all discrete units of waste in a waste movement. Consider the statistics presented in Table 5-4 for the required sample size when the proportion correct is known to equal 99 percent. If the owner/operator were to sample 24 drums in the waste movement and find that all tested were in conformance with the manifest, he would then have 95 percent confidence that no more than 4 percent (the bound on error) of the drums in the movement were inconsistent with the manifest. If 1 of the 24 tested drums proved inconsistent with the manifest, the proportion incorrect could then be as high as 8.2 percent, i.e.,

[100 percent - (percentage correct (23/24 x 100) + bound on error (4 percent))].

In the case where 95 percent of the units are historically correct, the error bounds for the noted conditions would be even greater, between 8 to 9 percent. To determine if abbreviated sampling or screening schemes are acceptable, the owner/operator must show proof that the associated increased levels of error will not jeopardize adequate or safe operation of his facility. If such an abbreviated scheme is proposed, it should be fully documented and supported in the permit application.

It should be noted that these tables have been calculated assuming very large shipments of drums. A correction factor must be applied to determine the required sample size for smaller shipments. The adjusted sample size required is computed as:

$$n^* = \frac{(N + 1)n}{N + n}$$

where n^* = adjusted sample size
n = sample size for large shipments (from tables)
N = number of drums in shipment.

Thus, for the example presented above, the required sample size of 24 drums would be adjusted to 17 drums if the total shipment were only 50 drums, i.e.,

$$\left(n^* = \frac{(50 + 1)24}{50 + 24} = 16.54\right).$$

5.3.4.4.2 Selection and Measurement of "Fingerprint Parameters"--To determine that the wastes received are the expected wastes it is useful to select "fingerprint parameters" based on the initial waste characterization for analysis after receipt of waste. We refer to these parameters as "fingerprint parameters" because we envision that they will be selected from the more comprehensive population of analytical parameters originally tested for, would be fairly simple to test during facility operation and receipt of waste, and testing of them would provide confidence that the waste is the expected waste, meets all necessary specifications, and the waste can be adequately stored, treated, or disposed of. Fingerprint parameters should be selected based on their unique ability to identify a waste, their variability as noted during initial analysis, the affect of that variability on your operation, and ease of detection.

Sameness will be assessed based on expected variability, as well as waste handling tolerances of the offsite facility, that is, the range of constituent concentrations for a given waste that a facility can accept. This allowable range of concentrations will be determined based on the nature of the waste. For instance, an inordinately high level of an otherwise acceptable constituent may make the waste reactive or otherwise incompatible with wastes disposed of in a given landfill cell. Alternatively, if the pH of the waste is greatly different than agreed upon (in a facility-generator agreement or contract), the waste may be incompatible with storage tank materials or surface impoundment liners. A given movement of semisolid waste found to contain free liquids may be unacceptable for receipt at a landfill which does not operate with a liner and leachate collection system.

Each movement of waste must be analyzed to the extent necessary to assure that wastes received are consistent with conditions and characteristics specified under agreements with the waste generator. Attainment of this goal rests on:

- Accurate and precise waste analysis before acceptance and receipt of waste;

- Accurate knowledge of the range of variability of characteristics of a given waste;

- Sound knowledge of the impact of waste characteristic variability on facility operation; and,

- Establishment of workable agreements between waste generator and owner/operator.

To meet these needs, the applicant should implement a strategy to select and analyze "fingerprint parameters" in representative waste samples collected from waste movements during facility operation. In Subsection 5.3.6.1.8, we provide a detailed example of the selection of fingerprint parameters for testing of a pharmaceutical waste received at an offsite landfill. The rationale for selecting the parameters is presented and is based on the initial waste analysis, the waste management technique, and ease of analyzing for the selected parameters.

5.3.4.4.3 Screening for Restricted Wastes--Proposed procedures for screening for restricted wastes are an important aspect of your waste analysis plan. Apart from the issue of health hazard that may be induced in the event of an incident; for success in operation, you should consider the adverse affect that restricted wastes might have on given operations at your plant. For instance, if you operate a biological treatment plant you would restrict highly toxic constituents that would upset the process, or you would handle such constituents in another manner. The selection of restricted components will depend on the capabilities and limitations of operations at your facility, the existence or likelihood of highly toxic or other undesirable wastes in your market area; and other factors such as public concern or comment. In general, as the variety of wastes accepted and the number of waste sources increase, the concern over and control of restricted wastes must also increase accordingly. In developing a plan for screening of restricted waste, you should consider the statistics noted in subsection 5.3.4.4.1. If there is a waste constituent highly likely to be generated in your market area and if your operation would be highly sensitive to unknowingly receiving that waste component, then it would be prudent to institute a screening procedure for that component which includes sampling of all discrete waste units received in waste movements which have any likelihood of containing that waste component. To determine the cost-effectiveness of instituting the complete screen, you might balance the cost of sampling and analysis versus revenue lost if an incident were to occur at your facility or if you were to restrict receipt of all waste from a generator whose waste might be contaminated with the unwanted constituent. The estimated cost of sampling and analysis should consider whether there is an applicable simple indicator parameter for the restricted constituent or whether the specific constituent must be detected using a particularly sensitive analytical technique. You should also consider whether sample compositing would mask detection of the constituent, thus requiring collection and analysis of grab samples.

5.3.4.5 Waste Analysis Requirements for Ignitable, Reactive, or Incompatible Wastes--

As noted in §264.13, the applicant is required to demonstrate waste analysis methods he will use in showing compliance with §264.17, General requirements for ignitable, reactive, or incompatible wastes. Waste analysis procedures for determining waste ignitability are fairly straightforward. SW-846[2] describes two methods for measuring waste ignitability, both of which measure the flash point of the tested waste. Method 1010 uses the Pensky-Martens closed cup tester to determine flash point for fuel oils, lube oils, suspensions of solids, liquids that tend to form a surface film under test conditions, and other liquids. Method 1020 uses the Setaflash Closed Tester to determine the flash point of paints, enamels, lacquers, varnishes, and related products. It is important for the applicant to note the exact procedure he will use to test flash point as a function of the waste type. More importantly, however, he must present a logical plan for testing the ignitability of generated wastes, or wastes received, to assure that no adverse reactions will occur in handling ignitable wastes. If ignitable wastes will be accepted and rendered nonignitable, the applicant's plan must be capable of documenting that treated wastes are, in fact, nonignitable. The plan must also account for specific requirements for ignitable wastes which are noted in Subparts I through N of Part 264. These requirements are discussed further in remaining subsections.

The applicant's planning for analysis of reactive or otherwise incompatible wastes must be well conceived because of the enormity of waste combinations which may be reactive. Some of the best guidance currently available on testing of waste compatibility are test plans and procedures which have been developed to manage and handle potentially incompatible or reactive wastes removed from CERCLA sites. One such scheme, shown in Figure 5-1,[6] was implemented by GCA at an uncontrolled hazardous waste site to characterize unknown wastes and could be used for segregating otherwise reactive or incompatible wastes.

Although this scheme, or some modification of it, may be applicable to RCRA facilities, its primary purpose is to assure safety when dealing with unknown wastes. A complex facility which handles a variety of wastes and stores or treats these wastes in common locations may require more definitive procedures for waste compatibility or reactivity testing. Such a scheme is currently under development by Acurex in support of the EPA's Municipal Environmental Research Laboratory.[7] Test procedures and a test kit are being developed to classify waste materials into reactivity groups (RGNs). These reactivity groups are as specified by Hatayama, et al., in EPA-600/2-80-076, A Method for Determining the Compatibility of Hazardous Wastes.[8] Once a waste is classified by its Reactivity Group Number, the matrix provided in EPA-600/2-80-076 can be used to identify compatible and incompatible waste combinations. The currently defined reactivity groups are shown in Table 5-5. The compatibility chart is not shown here, one reason being that it is currently under revision. Copies of the updated report will be available from NTIS, the National Technical Information Service in Springfield, Virginia.

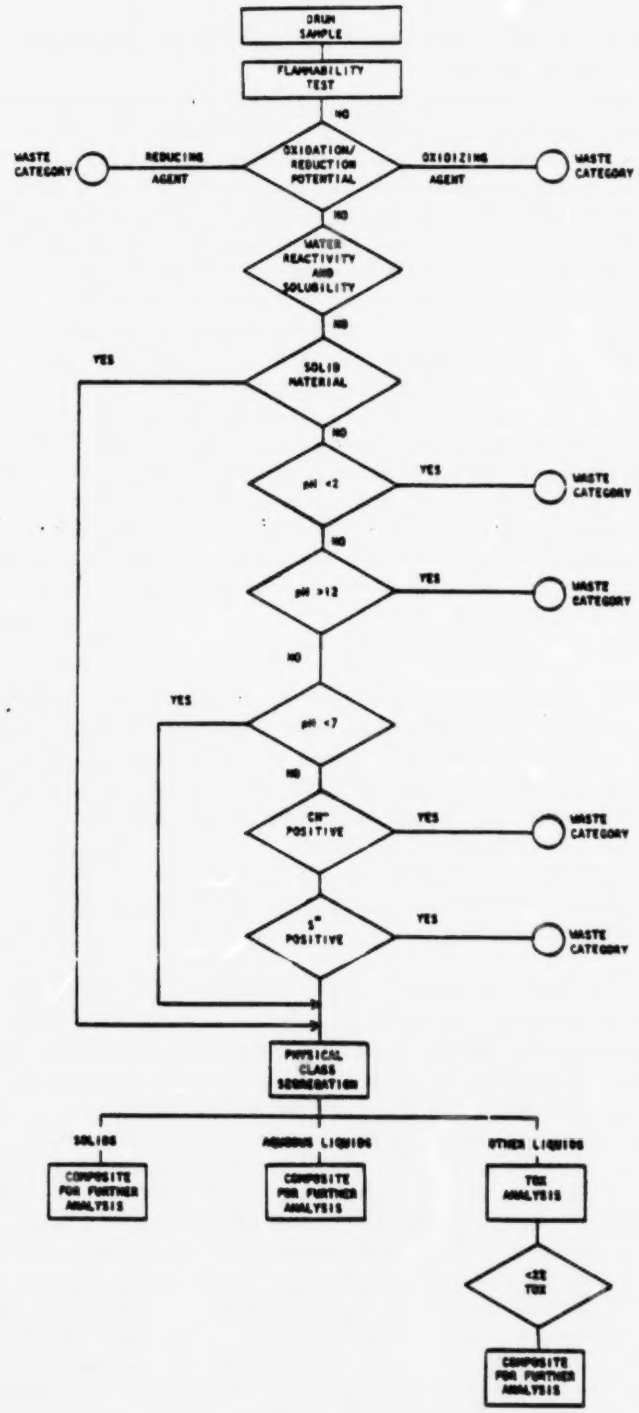

Figure 5-1. Example waste characterization scheme.
Source: Reference 6.

TABLE 5-5. REACTIVITY GROUP DEFINITIONS

Source: Reference 8.

Reactivity Group No.	Reactivity Group Name
1	Acids, mineral, nonoxidizing
2	Acids, mineral, oxidizing
3	Acids, organic
4	Alcohols and glycols
5	Aldehydes
6	Amides
7	Amines, aliphatic and aromatic
8	Azo compounds, diazo compounds, and hydrazines
9	Carbamates
10	Caustics
11	Cyanides
12	Dithiocarbomates
13	Esters
14	Ethers
15	Fluorides, inorganic
16	Hydrocarbons, aromatic
17	Halogenated organics
18	Isocyanates
19	Ketones
20	Mercaptans and other organic sulfides
21	Metals, alkali and alkaline earth, elemental and alloys
22	Metals, other elemental and alloys in the form of powders, vapors, or sponges
23	Metals, other elemental and alloys as sheets, rods, moldings, drops, etc.
24	Metals and metal compounds, toxic
25	Nitrides
26	Nitriles
27	Nitro compounds
28	Hydrocarbons, aliphatic, unsaturated
29	Hydrocarbons, aliphatic, saturated
30	Peroxides and hydroperoxides, organic
31	Phenols and cresols
32	Organophosphates, phosphothioates, phosphodithioates
33	Sulfides, inorganic
34	Epoxides
101	Combustible and flammable materials, miscellaneous
102	Explosives
103	Polymerizable compounds
104	Oxidizing agents, strong
105	Reducing agents, strong
106	Water and mixtures containing water
107	Water reactive substances

In addition to determining the reactivity characteristics noted in the scheme shown in Figure 5-1, the test procedure recommended by Acurex will define specific waste classes and allow for complete categorization of wastes according to chemical functionality. Any or all of these procedures can be employed, depending upon the discretion of the analyst and the completeness of information required.

The test procedures are organized into six series of tests, each included to provide specific information about the waste material. In several cases, results obtained at a specific stage in the testing sequence can sufficiently define the chemical characteristics of the waste material so that the need for further testing is eliminated. Each of the six procedure sets is summarized with a flow diagram which provides an overview of procedures involved in that particular procedure set. The six procedure sets are summarized in Table 5-6.

The full sequence of implementing these procedure sets to identify specific waste classifications is summarized in Figure 5-2. The Acurex manual[7] provides analogous diagrams for each procedure set along with descriptions and directions for implementing specific test procedures.

5.3.5 Guidance on Preparing Waste Analysis Plans for Specific Facility Types

This subsection provides guidance on preparing waste analysis plans suitable for specific facility types and suitable to address the specific waste analysis requirements of regulations specified in Part 264, Subparts I (Containers), J (Tanks), K (Surface Impoundments), L (Waste Piles), M (Land Treatment), and N (Landfills). Examples are presented in Section 5.3.6 to illustrate the level of detail that the applicant is expected to provide in the waste analysis plan. Although presented for specific facilities, the discussions and examples cover the general requirements specified in §264.13 for all facilities and for offsite facilities.

Table 5-7 summarizes the waste analysis requirements for §264.13 and identifies the objectives that the waste analysis plan must fulfill to assure support of the facility specific standards (Subparts I to N). These specific standards implicitly require some type of waste analysis to identify incompatible, reactive, or ignitable wastes; determine that wastes are compatible with facility equipment liners, and surfaces; determine that storage facilities are decontaminated at closure; and to fulfill several other specific objectives noted in the table. To illustrate the commonality and overlap of these specific facility standards and to indicate where similarities in waste analysis plans will exist for different facility types, we have summarized the noted regulations in Table 5-8.

An abundance of facility specific scenarios exist and cannot all be specifically addressed by examples. However, review of the examples presented here should assist in preparing waste analysis plans for other types of facilities not specifically addressed. As noted earlier, the EPA is preparing a Waste Analysis Plan Guidance Manual which builds on the concepts and examples presented here. That manual will be available in the spring of 1984.

TABLE 5-6. PROCEDURE SETS FOR CLASSIFYING HAZARDOUS WASTES BY REACTIVITY GROUP NUMBER

Source: Reference 7.

Procedure Set	Title	Information Obtained
1	pH and Redox Tests	Acidity, basicity, oxidizing and reducing potential
2	Solution-Reactivity and Special Functionality Tests	Identification of sulfides and cyanides, reactivity and solubility in acids and solvents, reactivity with water, presence of water
3	Flame Test	Combustibility, classification as organic or inorganic, identification of explosives
4	Sodium Fusion and Ferrox Tests	Identification of oxygen, nitrogen, phosphorous, sulfur, and halogen in organic waste materials
5	Organic Functionality Tests	Presence of specific organic functional groups
6	Inorganic Functionality Tests	Presence of elemental metals, heavy metal compounds, and inorganic fluorides

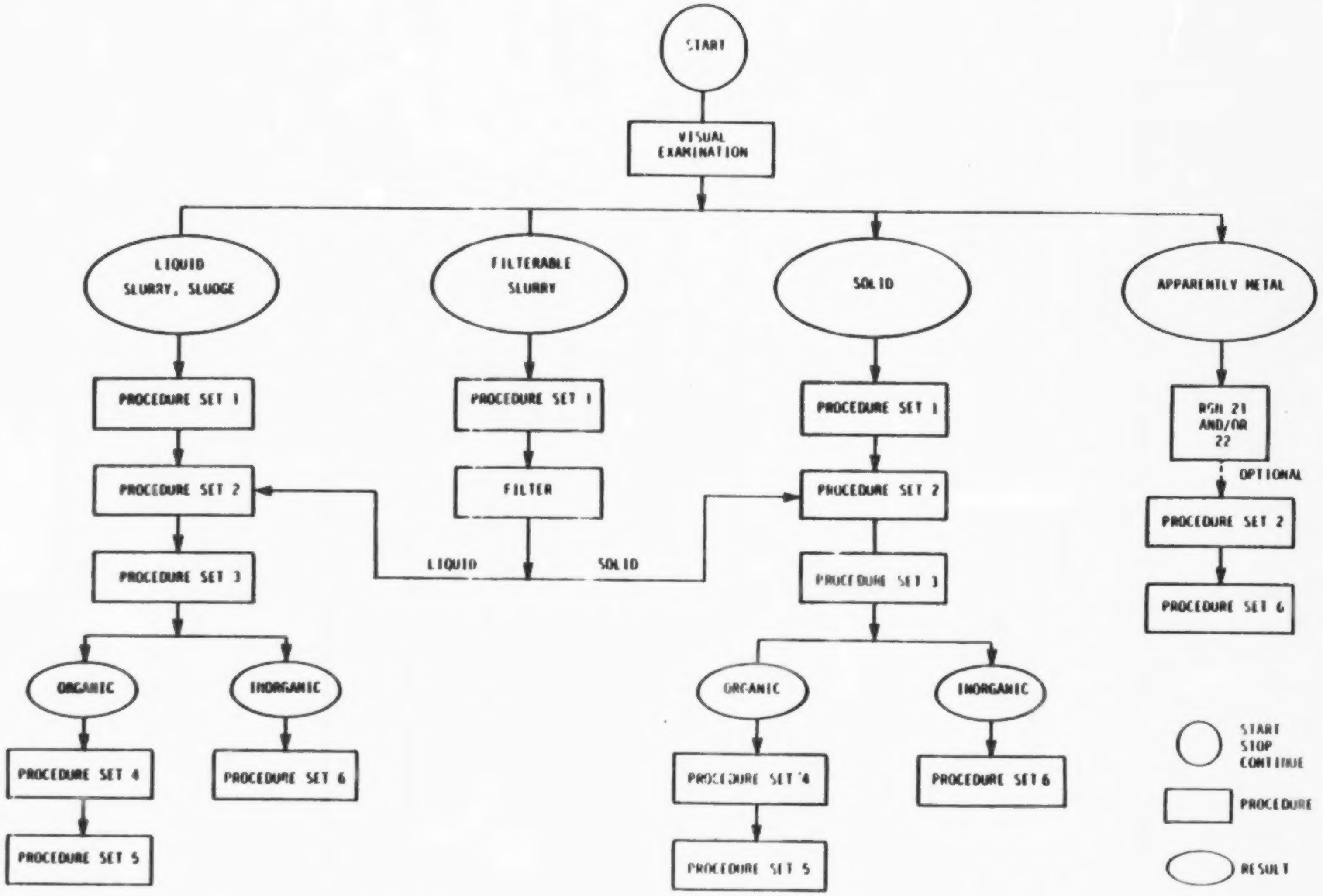

Figure 5-2. Sequence of procedure sets designed by Acurex.

Source: Reference 7.

TABLE 5-7. OBJECTIVES OF THE WASTE ANALYSIS PLAN BASED ON GENERAL AND SPECIFIC REGULATIONS

Part 264 Citation	Objectives of the Waste Analysis Plan
General Waste Analysis	
§264.13	• Characterize the waste to assure that, after receipt, the waste can and will be successfully treated, stored, or disposed of.
	• For offsite facilities, demonstrate waste analysis procedures for each waste movement to check for consistency between the waste and the waste manifest.
	• Assure that the initial waste analysis is reviewed or repeated on a routine basis, and on an as-needed basis if a change in waste characteristics is suspected.
	• Document waste analysis methods for characterizing incompatible, ignitable, or reactive wastes.
Subpart I - Containers	
§264.172	• Assure compatibility between the waste and the container.
§264.175	• Characterize leaks, spills, or accumulated precipitation in containment systems.
	• Document that wastes do not contain free liquids and, therefore, containment systems may not be necessary.
§264.176	• Identify containers holding ignitable or reactive wastes so that they can be located at least 15 meters (50 feet) from the property line.
§264.177	• Identify incompatible wastes so that they will not be placed in the same container unless the provisions of §264.17(b) are complied with.

(continued)

TABLE 5-7 (continued)

Part 264 Citation	Objectives of the Waste Analysis Plan
§264.177	• Assure that containers to be used to store different wastes are adequately washed of previously held incompatible wastes.
§264.178	• Demonstrate decontamination of containers and related equipment at closure.
Subpart J - Tanks	
§264.192	• Assure compatibility between the waste and the tank.
§264.197	• Demonstrate that all hazardous wastes and hazardous waste residue are removed from tanks and related equipment at closure.
§264.198	• Demonstrate that ignitable or reactive wastes are no longer ignitable or reactive if placed in a tank and that §264.17(b) is complied with.
	• Identify ignitable and reactive wastes to be stored in covered tanks in compliance with NEPA buffer zone requirements.
§264.199	• Identify incompatible wastes so that they will not be placed in the same tank unless the provisions of §264.17(b) are complied with.
	• Assure that tanks to be used to store different wastes are adequately washed of previously held incompatible wastes.
Subpart K - Surface Impoundments	
§264.221	• Assure compatibility of wastes and leachates with liner materials.

(continued)

TABLE 5-7 (continued)

Part 264 Citation	Objectives of the Waste Analysis Plan
§264.228	• Demonstrate removal or decontamination of waste residues and any contaminated components, soil, or other equipment at closure. • Demonstrate the absence of free liquids if wastes are solidified at closure • Document whether waste residues or contaminated materials are left in place at closure to determine if the post closure care requirements of §§264.117-264.120 apply.
§264.229	• Demonstrate that ignitable or reactive wastes are no longer ignitable or reactive if placed in a surface impoundment and that §264.17(b) is complied with.
§264.230	• Identify incompatible wastes so that they will not be placed in the same surface impoundment unless the provisions of §264.17(b) are complied with.
Subpart L - Waste Piles	
§264.250	• Identify the presence of liquids or free liquids and determine if leachate can be generated through decomposition or other reactions if any exemption from §264.251 is sought under §264.250(c).
§264.251	• Assure compatibility of wastes and leachates with the liner and leachate collection system materials.
§264.256	• Demonstrate that ignitable or reactive wastes are no longer ignitable or reactive if placed in a surface impoundment and that §264.17(b) is complied with.
§264.257	• Document that incompatible wastes and materials are not placed in the same pile unless §264.17(b) is complied with.

(continued)

TABLE 5-7 (continued)

Part 264 Citation	Objectives of the Waste Analysis Plan
§264.257	• Determine if wastes and materials in one pile are incompatible with those of another pile or other containment facility so that suitable physical separation can be implemented.
	• Assure that bases to be used to store wastes are decontaminated of previously stored incompatible wastes.
§264.258	• Demonstrate removal or decontamination of waste residues and any contaminated components, soil, or other equipment at closure.
	• Document whether waste residues or contaminated materials are left in place at closure to determine if the post closure care requirements of §264.310 apply.
Subpart M - Land Treatment	
§264.272	• As part of the treatment demonstration, obtain waste analysis data to characterize the wastes and identify constituents listed in Appendix VIII of Part 261.
§264.273	• Obtain waste analysis data to assure proper control of soil pH, enhancement of microbial or chemical reactions, and control of moisture content in the treatment zone.
§264.276	• For facilities proposing growth of food chain crops, identify Part 261, Appendix VIII constituents reasonably expected to be in or derived from wastes.
	• Similarly, document the presence and concentration of cadmium in the waste and the pH of the waste and soil mixture.

(continued)

TABLE 5-7 (continued)

Part 264 Citation	Objectives of the Waste Analysis Plan
§264.281	• Demonstrate that ignitable or reactive wastes are no longer ignitable or reactive after incorporation into the soil.
§264.282	• Assure that incompatible wastes are not placed in or on the same treatment zone unless §264.17(b) is complied with.
Subpart N - Landfills	
§264.301	• Assure compatibility of wastes and leachates with the liner and leachate collection system materials.
§264.312	• Demonstrate that ignitable or reactive wastes are no longer ignitable or reactive if placed in a landfill and that §264.17(b) is complied with.
	• Determine if wastes in containers are ignitable. If containers holding ignitable wastes are disposed of, determine that the disposal cells do not and will not contain wastes that generate heat sufficient to ignite the containerized ignitable waste.
§264.313	• Assure that incompatible wastes are not placed in the same landfill cell unless §264.17(b) is complied with.
§264.314	• Determine whether wastes are liquids or contain free liquids.
	• Determine that liquid wastes or wastes containing free liquids no longer contain free liquids if disposed of in a cell without a leachate collection and removal system.

(continued)

TABLE 5-7 (continued)

Part 264 Citation	Objectives of the Waste Analysis Plan
§264.314 (cont.)	● Determine that containers which once held free liquids can be placed in a landfill cell by demonstrating that free standing liquids have been removed, that they have been mixed with absorbent or solidified, or that they have been otherwise eliminated.
§264.315	● Determine that containers, other than small ones such as ampules, are at least 90 percent full before disposal.
§264.316	● Demonstrate that wastes in lab packs are compatible with the inside containers of the lab pack.
	● Determine the liquid contents of the wastes or inside containers so that a sufficient quantity of absorbent material can be placed in the lab pack.
	● Demonstrate that the contained waste and absorbent material are compatible.
	● Demonstrate that incompatible wastes are not placed in the same outside container.
	● Determine whether wastes in lab packs are ignitable or reactive and if so, whether they are cyanide or sulfide bearing wastes.

TABLE 5-8. SUMMARY OF SPECIFIC REQUIREMENTS FOR WASTE ANALYSIS NOTED IN SUBPARTS I THROUGH N

	Containers	Tanks	Surface impoundments	Waste piles	Land treatment	Landfills
Compatibility						
Waste and facility materials	264.172	264.192	264.221	264.251		264.301
Waste and waste(s) in same location	264.177	264.199	264.230	264.257	264.282	264.313
Waste and waste(s) not in same location, but in proximity				264.257		
Waste and previously used unwashed receptacles	264.177	264.199		264.257		
Liquids						
Free liquids	264.175					
No free liquids if wastes are solidified at closure			264.228			
Identify the presence of liquids or free liquids				264.250		264.314
Ignitable/Reactive Wastes						
Identify ignitable or reactive wastes for proper handling or document that the wastes have been rendered nonignitable or nonreactive	264.176	264.198	264.229	264.256	264.281	264.312
Residual Material						
Assure decontamination at closure	264.178	264.197	264.228	264.258		
Identify whether residuals are left in place			264.228	264.258		
Miscellaneous						
Characterize leaks, spills, or accumulated precipitation in containment systems	264.175					
Identify Part 261, Appendix VIII constituents					264.272	
Obtain waste analysis data to assure proper control of pH, enhancement of microbial or chemical reactions, and control of moisture content in the treatment zone					264.273	
For facilities proposing growth of food chain crops, identify Part 261, Appendix VIII constituents					264.278	
Document presence and concentration of cadmium in the waste, and the pH of the waste and soil mixture					264.276	
Document that containers, other than small ones such as ampules, are 90% full before disposal						264.315
Identify cyanide- or sulfide-bearing reactive wastes						264.316

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5.3.6 Waste Analysis Plan Examples

Examples are provided here to indicate the type of information permit applicants should provide as well as the level of detail necessary to interpret the adequacy of their proposed plans. The examples provided are for a hypothetical offsite landfill unit (part of a larger TSD facility), and an onsite container storage facility.

5.3.6.1 Example: New Offsite Landfill--

It is expected that a high percentage of Part B applicants will be pursuing permits for new offsite landfill units. Therefore, we have incorporated the following example to illustrate the associated waste analysis plan application information requirements. This example mirrors the level of detail required to support the general facility standards for waste analysis included in §264.13. The landfill unit considered in the example is part of a new offsite treatment, storage, and disposal facility.

The example provided is not meant to be an entire waste analysis plan. Components for which we provide examples include:

- Waste analysis parameters and rationale for selection
- Rationale for selection of additional parameters for specific waste streams
- Procedures for reviewing or repeating the initial waste analysis
- Waste analysis procedures for each waste movement, including:
    - screening of all wastes for consistency with manifest and associated sampling methods
    - procedures for documenting that the received waste is the expected waste (fingerprint analyses and associated sampling methods)
    - procedures for screening restricted wastes and associated sampling methods
- Procedures for accepting or rejecting waste movements

Other important components of a waste analysis plan for this facility that are not specified here include:

- Specific Quality Assurance/Quality Control Procedures
- Waste Analysis Procedures for Ignitable, Reactive, and Incompatible Wastes
- Waste Analysis Procedures for Demonstrating Compatibility of Wastes and Leachates with Landfill Liners

5.3.6.1.1 Waste Analysis Parameters and Rationale for Selection--The XYZ Landfill is planned for location in East St. Louis, Missouri. We expect a broad gamut of wastes; solid, sludge, and bulk liquids; inorganic and organic in nature. As noted in our facility description, our landfill units will be used for disposal of solids and semi-solids as they are received at the site as well as residuals which are generated by our onsite waste treatment processes.

Disposition of wastes to different units at our facility will depend primarily on generic waste classification as noted in Table 5-9. Most wastes will undergo treatment of some type before landfilling. However, solids and aqueous wastes with less than 40 percent water content will be directly landfilled.

> [Note: The applicant should include a detailed diagram to illustrate all operations at the facility and the relationship of other units with the landfill cell.]

Waste parameters we will analyze for will depend on the classification of the waste, disposition at our facility, and the specific industry generating the waste. Parameters that we have selected based on the first two factors are presented in Table 5-10. The rationale for selection of these parameters is discussed below. Additional parameters will be selected based on specific waste types. Discussion of selection of parameters for specific wastes also follows.

The parameters noted in Table 5-10 have been selected on the following basis:

- pH, alkalinity, and acidity--These parameters will be tested in aqueous wastes, and sludges and slurries to determine the amount of neutralizing agent required for treatment and the applicability of recovering acids or bases. These parameters will be measured in 1:1 water mixtures for solid wastes to determine compatibility of wastes and leachates with the PVC membrane liners to be used in our landfill cells. Additionally, solid wastes with appropriate characteristics might also be used as reagents in portions of our treatment system. Significant changes in the pH, alkalinity, or acidity of aqueous wastes and sludges or slurries will influence treatability, cost of treatment, and types of residuals remaining after treatment.

- Specific anions and cations--These parameters will be characterized in aqueous wastes, slurries, sludge, or inorganic solid samples to account for major constituents or type of acid/base/salts present. Cyanide and sulfide will be measured at the ppm level because of possible reactivity during storage or treatment. Changes in levels of specific anions and cations will affect treatment and disposal options.

TABLE 5-9. DISPOSITION OF MAJOR CLASSES OF WASTES RECEIVED ONSITE

	Disposition			
Waste classification	Storage tanks for testing and further processing	Physical/chemical treatment	Incineration	Landfill
Aqueous				
≥40% water [acidic, alkaline, and metallic]	X	X [sludge to landfill]		
<40% water				X
Organic Liquids				
flammables			X [ash to landfill]	
combustibles			X [ash to landfill]	
solvents/degreasers	X	X [residue to landfill]		
Sludges and Slurries				
organic			X [residue to landfill]	
inorganic		X [residue to landfill]		
Solids				
organic				X
inorganic				X

TABLE 5-10. ANALYTICAL PARAMETERS SELECTED FOR GIVEN WASTE CLASSIFICATIONS

	Waste classification			
Waste analysis parameters	Aqueous	Organic liquids	Sludges and slurries	Solids
pH	X		X	X
Acidity/alkalinity	X		X	X
Anions/cations	X		X	X
Heavy metals	X	X		
Solids/volatile solids	X	X	X	
Water or liquid content	X		X	X
Free liquids			X	X
Viscosity	X	X	X	
Specific gravity	X	X	X	
Flash point	X	X	X	X
Reactivity group	X	X	X	X
TOX/TOC	X		X	
Selected organics	X	X	X	X
Ash		X	X	X
Higher heating value		X	X	X

- Heavy metals--Heavy metals such as chromium, zinc, copper, lead, and others will be measured in aqueous and organic liquids to ppm levels to determine treatability using hydroxide precipitation. Sludge from this treatment will be landfilled.

- Solids and volatile solids--Type and concentration of solids are important for aqueous and slurry/sludge samples to determine treatability (i.e., incineration, biological, or phase separation) and pumping/handling characteristics. Significant changes in solid concentrations will affect treatment efficiency and may reflect a change in the waste chemical composition.

- Water content--Water concentration will be measured to determine whether wastes will be treated (≥40 percent water) or directly landfilled (<40 percent water).

- Free liquids--Free liquids will be measured in drummed wastes to determine handling procedures we should expect to implement if the wastes are accepted. If free liquids are present, we will decant and treat the liquids, or add absorbent to the containers holding free liquids so that they are no longer in evidence.

- Viscosity--Viscosity values will help determine the method of waste handling, blending, and storage. Highly viscous wastes may require heating or special pumps for transfers. Changes in viscosity may affect handling and storage requirements or may indicate a change in other waste characteristics.

- Specific gravity--Specific gravity is selected because significant changes are strongly indicative of changes in waste characteristics. Specific gravity is important in determining settleability or buoyancy of wastes in suspension, as well as treatability in other process units.

- Flash point--Flash point will be measured to determine waste ignitability and, thus, necessary waste handling practices. Bulk ignitable solids will be rendered nonignitable before landfilling. Ignitable wastes in containers will be landfilled in comformance with the container disposal standards of §§264.312-264.316. [Although incinerators are not specifically addressed in this manual, ignitable organic wastes will be incinerated at this hypothetical site and ash will be landfilled.]

- Reactivity group--At full operation, we expect to receive a wide variety of wastes at our facility. Therefore, as a determinant of waste acceptability (i.e., to assure that incompatible wastes are not mixed) we will classify each candidate waste by reactivity group (see Hatayama, et al., EPA-600/2-80-076). Some of the reactivity groupings can be identified as a result of the parameters already selected for analysis such as pH and flash point. Thereafter, however, other specific procedures must be implemented to classify a waste into one of the current 41 reactivity groups. We will follow the test protocols currently recommended by Acurex[7] to determine waste reactivity groupings.

- TOX, TOC--Wastes which are predominantly inorganic in nature will be tested for total organic halogen and total organic carbon content as an additional waste identification method. Changes in the organic content of inorganic waste may signal changes in the waste and may influence waste treatability.

- Selected organics--We will test all wastes which are potentially contaminated with PCBs or dioxins for PCBs and dioxin to determine if the wastes should be accepted or rejected. Other specific organics will be selected for analysis based on the waste under consideration, existing knowledge of the waste, information provided by the generator, and information gained during our visit and inspection of the generating facility. Chlorinated and halogenated solvents or degreasers must be carefully screened to assure compatibility with our biological treatment process.

5.3.6.1.2 Rationale for Selection of Additional Parameters for Characterization of Specific Waste Streams--To assure that our waste analysis plan is comprehensive enough to assure successful handling of all wastes, we must select parameters for analysis based on specific waste types. We have attempted to determine the specific waste categories and types that we may encounter by reviewing and compiling existing industry/waste statistical data for the East St. Louis market area. We have reviewed results of surveys conducted by the East St. Louis Waste Commission (ESWC) and the State of Missouri Hazardous Waste Board (MHWB). The results of our review are presented in matrix form in Table 5-11, illustrating waste types and associated industrial generators by 2-digit SIC code.

Analytical parameters will be selected for specific wastes as a means of identifying each waste by setting specification limits or tolerances on waste components. For instance, trichloroethylene sludge from an electrical machinery manufacturer (SIC Code 34) will be tested for those parameters noted earlier in Table 5-11, as well as for metallic species which are used in the manufacturing process. These constituents will then be considered for use in identifying the waste based on their intrinsic variability, concentration, ease of detection, and impact on sludge treatability.

[Note: The applicant should identify test parameters for all specific wastes and the rationale for their selection if he currently knows or has foreknowledge of the identity of specific candidate wastes. A tabular format is suggested to provide a concise presentation.]

5.3.6.1.3 Procedures for Reviewing or Repeating the Initial Waste Analysis--We routinely reanalyze generator's wastes on a quarterly basis. Wastes which we receive less frequently than once every 3 months are reanalyzed upon receipt. Any time we repeat the initial waste analysis, we analyze for all parameters originally selected.

TABLE 5-11. SUMMARY OF WASTE SURVEY ANALYSIS

Waste categories and types	Waste classification	Two Digit SIC Code 20	24	26	27	28	30	33	34	35	36	39
Explosives									X			
Flammables	Organic liquids and sludges											
Acetone				X				X	X	X	X	
Methylethyl Ketone (MEK)				X			X		X	X	X	
Isopropyl Alcohol										X	X	
Toluene						X			X	X	X	
Xylene						X			X	X	X	
Paint Solvent & Thinner					X	X			X	X	X	X
Stoddard Solvent		X						X	X		X	
Mixed Solvents & Oils									X		X	
Solvents		X		X	X	X		X		X	X	X
Kerosene					X						X	
Turpentine												X
Varnish										X		
Solvents & Solidified Paint		X		X					X		X	
Printers Ink			X		X							
Paint Filters									X	X		
Combustibles	Organic liquids sludges, and solids											
Oils		X	X	X	X	X	X	X	X	X	X	X
Oils Mixed with Halogenated Solvents						X			X			X
Grease & Oils		X		X	X	X	X	X	X	X	X	
Paint Sludge					X	X	X					
Oil Sludge					X	X	X		X	X		X
Solidified Paint									X			
Solidified Phenolic Compounds			X			X	X	X	X	X	X	
Ink Residue					X							
Halogenated Solvents & Degreasers	Organic liquids and sludges											
Freon										X		
Methylene Chloride										X	X	
Trichloroethylene					X			X	X	X	X	
Trichloroethylene Sludge									X			
Chlorinated Hydrocarbons and Other Synthetic Organics	Organic liquids											
Herbicides						X						
Pesticides						X						

(continued)

TABLE 5-11 (continued)

Waste categories and types	Waste classification	Two Digit SIC Code										
		20	24	26	27	28	30	33	34	35	36	39
Cyanides & Isocyanates	Inorganic liquids and sludges											
Sodium Cyanide & Sludge							X	X	X	X		
Acidic Wastes	Aqueous Inorganic											
Chromic Acid										X		X
Hydroflouric Acid									X	X	X	X
Hydrochloric Acid												X
Nitric Acid												X
Sulfuric Acid												X
Acetic Acid												X
Ferric Chloride												X
Ammonia Persulfate												X
Solder Stripper											X	
Acids						X	X		X	X	X	
Alkaline Wastes	Aqueous Inorganic											
Spent Caustic						X	X	X	X	X	X	X
Alkaline Etchant										X		X
Spent Ammonia											X	
Detergents						X						
Metallic & Inorganic Compounds	Aqueous Inorganic & Inorganic Sludges & Solids											
Mercury		X							X		X	
Heavy Metal Solution						X						
Electroless Copper											X	
Heavy Metal Sludge						X			X	X	X	
Lead Compounds		X				X			X			
Chromate Compounds										X	X	
Zinc Compounds								X	X	X	X	
Aluminum								X	X			
Phosphorous Compounds								X	X		X	
Sulfur Compounds								X				

We also repeat the initial waste analysis on a contingent basis if we are informed by the generator that his production process has changed or if he indicates a known change in the waste. If we are notified that the production process has changed, we conduct a new generator audit and reevaluate our original listing of analytical parameters for the waste. We then conduct applicable analyses, decide whether to continue to accept the waste and define new fingerprint parameters and tolerance bands, if necessary.

If the generator informs us of a known change in his waste, we will conduct a new generator audit depending on the nature of the change. In any event, we repeat all analyses which were conducted to initially characterize the waste and test for any new parameters which would reflect the known change in the waste. We then reevaluate the acceptability of the waste and the list of fingerprint parameters and established tolerance bands.

If any abnormality occurs at our facility during waste handling, such as fume generation or equipment deterioration or other incidents, we will repeat the initial waste analysis for any waste or wastes which are suspected to have caused the incident.

5.3.6.1.4 Waste Analysis Procedures for Each Waste Movement--We will implement a variety of waste analysis procedures to characterize each waste movement to document consistency between the waste and manifest, assure that the waste we receive from a generator is the waste we expect to receive, and to screen out restricted wastes. Although we require all generators to notify us of changes in wastes and although we fully reanalyze all wastes on the basis noted above, we will implement a variety of screening tests applicable to all wastes, and specific tests dependent on waste type, on a routine basis to assure fulfillment of these objectives.

5.3.6.1.5 Waste Screening Procedures--To screen wastes and assure consistency between a waste movement and the accompanying manifest, we will count all discrete units in the movement or weigh the entire movement, depending on the type of containment used and the waste description on the manifest. We will then visually inspect and test all discrete units of waste in each waste movement. We will inspect all waste units for physical state, texture, visible liquids, and odor. We will test all waste units by collecting grab samples and analyzing them for pH and specific gravity. Each waste unit of a waste movement means the following:

- all drums or containers on a truck
- all accessible ports on a tank truck
- all compartments of a truck carrying bulk solids or sludges

We will collect representative samples from all types of waste containers upon delivery using the following sampling equipment:

Waste type	Sampling equipment
Liquids and slurries	COLIWASA
Sludges	Trier
Loose powders or granules	Thief
Packed powders or granules	Auger
Large grained solids	Large Trier

5.3.6.1.6 Fingerprint Analyses and Sampling Methods--We will select indicator or fingerprint parameters for specific wastes pending the results of the initial waste analysis. Fingerprint parameters will be selected based on their perceived ability to provide rapid and reliable evidence that the waste received is the same as the waste expected within defined tolerance limits. As a matter of course, any time we have not received a specific generator's waste for more than 3 months, we will repeat the initial full analysis on a representative sample taken from the waste movement.

Sample types that we will collect for analyzing fingerprint parameters will be waste specific depending on the sampling technique that was used to initially characterize the waste and on the form of waste shipment. Table 5-12 presents our general approach to defining sample types depending on waste classification and type of waste containment used in shipping. Depending on the specific waste and generator, we may vary this procedure, but generally only to implement more stringent procedures.

To further illustrate our proposed procedures and rationale for selecting fingerprint or indicator parameters, we present the following discussion.

> [Note: We have selected one example waste below and present narrative discussion to provide a clear indication of the information required in applications. The applicant should provide enough examples to cover the full range of wastes expected to be received. Furthermore, if a multitude of different wastes are accepted, you should rely on tabulated data and accompanying discussion to present a comprehensive plan for checking all waste movements.]

We have contacted one generator who produces pharmaceutical intermediates. Information which he supplied to us indicated that his waste contained a high concentration of methylene chloride and other components such as heavy metals (zinc, iron), sodium sulfates and p-dichlorophenol. We subsequently obtained four replicate representative samples during our visit to his facility. The parameters we selected for analysis and the quantitative results are shown in Table 5-13. These samples were collected over a period of 2 weeks during normal plant operation. Clearly, the waste characteristics are relatively constant and any wide variation in any of the parameters upon further testing will be indicative of a change in the waste. Therefore, we will select fingerprint parameters from the list in Table 5-13 on the basis of speed and

TABLE 5-12. DEFINITION OF SAMPLE TYPES FOR ANALYSIS OF FINGERPRINT PARAMETERS

	Types of containment used for waste movement			
Waste classification	Drums	Large containers	Open bed trucks	Closed or tank trucks
Liquids	Grabs from 3 levels are taken from 10% of drums, and are composited into 3 total samples for analysis	COLIWASA samples are taken from 25% of the containers and are analyzed	Not applicable	COLIWASA samples are taken from 3 sampling ports for analysis
Slurries or sludges	Grabs from at least 2 levels are taken from 10% of drums, and are composited into a minimum of 4 samples for analysis	As for drums containing slurries and sludges	The truck is divided into a 5 x 10 grid and a random sampling procedure is used to collect 5 samples for analysis	A trier is used to collect 2 replicate samples from 3 sampling ports. The pairs are composited for analysis
Solids	Grabs are taken from one of three different levels in 10% of drums. At least 3 samples are composited from grab samples taken at equal levels in different drums	As for drums containing solids	As for open bed trucks carrying slurries or sludges	As for closed or tank trucks carrying slurries or sludges

TABLE 5-13. RESULTS OF INITIAL ANALYSIS OF PHARMACEUTICAL WASTE[a]

Analytical Parameters	Replicate Sample Number			
	1	2	3	4
pH	7.9	8.3	8.1	7.9
Alkalinity	116	125	130	118
Sodium	12,500	12,700	12,100	13,000
Sulfate	23,000	18,500	18,500	18,600
Zinc	1.2	2.0	1.9	1.7
Iron	2.7	2.7	4.0	1.8
Total Solids	31,500	34,000	32,100	32,600
Water Content	98.5%	96.1%	98.0%	97.4%
Viscosity	0.95cp	0.97cp	0.97cp	0.95cp
Specific Gravity	1.09	1.06	1.05	1.08
Flash Point	185°C	198°C	197°C	213°C
Reactivity Group No.	106	106	106	106
TOC	2,900	2,950	3,650	3,050

[a]Results are reported in mg/l except as noted.

ease of measurement, as influenced by the selected waste handling method. Based on the waste analysis, we will treat this waste in our physical/chemical/biological treatment system which incorporates solids sedimentation, activated sludge, and polishing using granular activated carbon. Considering all factors, we have designated the following parameters for fingerprinting this waste:

Fingerprint Parameters	Concentration Tolerances
pH	8 ± 0.8
Specific gravity	1.07 ± 0.06
Total solids	32,000 ± 6,500 mg/ℓ
TOC	3,000 ± 1,000 mg/ℓ
Zinc	≤2.5 mg/ℓ

In addition to being easy to measure, these parameters were designated as fingerprint parameters for the following reasons:

- pH
  - avoid handling strong acids or bases, associated neutralization costs, and possible corrosion or reactivity problems
- specific gravity
  - assure efficient settling upon treatment
  - reliable indicator of waste change
- total solids
  - avoid treatment process upsets
- TOC
  - acts as indicator for methylene chloride, p-dichlorophenol, and other water soluble organics
- Zinc
  - avoid high zinc concentrations which could be toxic to biological mass in activated sludge process

5.3.6.1.7 Procedures for Screening Restricted Wastes--We do not accept explosives, radioactive wastes, or wastes contaminated with PCBs or dioxin. We screen all waste movements for such constituents. If wastes from a particular generator do not exhibit these characteristics either historically or based on the initial waste characterization, we implement the following waste screening procedures:

- Explosives--Three random samples from a bulk waste movement or three composite samples from random sampling of 25 percent of the discrete units in a waste movement are each tested for flash point and flammability.

- Radioactivity--A Geiger Counter is used to count each discrete waste unit in a waste movement. We walk around the full circumference of bulk waste movements with the detector to determine the presence of radioactive material.

- Dioxin and PCBs--Two random grab samples are taken from the waste movement and dioxin or PCBs are detected using GC/MS.

If historical information or initial waste characterization indicates that wastes may be contaminated with any restricted components, we implement the following waste screening procedures:

- Explosives--Five random samples from a bulk waste movement or grab samples from all discrete units of the movement are tested for flashpoint and flammability.

- Radioactivity--A Geiger Counter is used to count each discrete unit in a waste movement. For bulk waste movements, we collect five random grab samples for counting after an initial pass around the circumference of the waste carrier.

- Dixoins and PCBs--For waste oils and other waste types that may be contaminated, we collect 12 random samples and composite them into 4 samples for detection of dioxin and PCBs using GC/MS.

5.3.6.1.8 Procedures for Accepting or Rejecting Waste Movements--We will reject wastes for the following reasons in the noted order of priority:

(1) the waste movement and/or included waste units are found to be inconsistent with the manifest information

(2) the waste movement is a restricted waste or includes waste units that are restricted

(3) fingerprint analyses indicate off-specification conditions.

In support of (1), we first visually inspect the waste and conduct analyses for pH and specific gravity. If visual inspection or analysis indicate no discrepancies we proceed to check each waste for restricted wastes. If discrepancies seem apparent based on visual inspection, we postpone a decision to reject until after the wastes are screened for restricted components and/or fingerprint analyses are conducted.

As noted earlier we do not accept any explosive or radioactive wastes, or any wastes contaminated with dioxin or PCBs. If any screening test results are positive for these components, the wastes are immediately considered for rejection. General procedures we implement to reject a waste are noted under the discussion below for fingerprint analyses.

Our last waste acceptance test procedure is testing for fingerprint parameters. To illustrate our overall plan for selecting fingerprint parameters, collecting samples, conducting analyses and, ultimately, accepting or rejecting the wastes based on the fingerprint analyses, we continue the example for the pharmaceutical waste initiated earlier.

[Note: In your application, you should include several examples to indicate procedures for a representative cross-section of waste types.]

After selecting the fingerprint parameters (pH, specific gravity, solids, TOC, and zinc) for the pharmaceutical waste, we negotiated a contract with the generator which, among other things, set out requirements for information to be noted on the manifest accompanying his waste. We have requested the generator to identify his waste as "aqueous pharmaceutical waste--Control No. AP974", to note the concentration tolerances for the selected five fingerprint parameters, and to specify the color (aqueous-turbid) and odor (solvent-methylene chloride) of the waste. On a routine basis, we ask all generators to note on the manifest any hazards in visually inspecting wastes. While one laboratory technician visually inspects the waste, a copy of the manifest will be taken to our onsite laboratory to assist in locating the generator file and all necessary information for conducting the fingerprint analyses. While visually inspecting the waste, collecting representative samples, and analyzing collected samples, the transport vehicle is located in a designated waste holding area until all fingerprint parameters have been analyzed and the acceptability of the waste shipment is determined.

Waste AP974 is delivered in tank trucks. To collect a representative sample we use a COLIWASA sampler to collect three samples along three vertical transects located at the three roof hatches on the tank truck. Two of these samples are analyzed for the noted fingerprint parameters and the third is held for confirmatory testing if necessary. If tested components are within specified tolerances for both samples, the waste is accepted. If any components are outside allowable tolerance bands, further analytical testing is required. If only one of the tested samples shows a deviation, an aliquot of that sample is tested along with the third sample previously held aside. If both samples are within tolerance bands, the waste is accepted; otherwise the shipment is rejected and the generator is contacted to resolve the problem.

If during original testing of the first two of three collected samples, both tested samples indicate analytical results outside the specified tolerance bands for the fingerprint parameters, the waste shipment is rejected and the generator is contacted.

Once a generator is contacted for resolution of such a problem, we advise him that his waste has been rejected because of determination of off-specification conditions based on analysis of two or more representative samples of his waste. We will resample and reanalyze the waste only if discussions with the generator present strong evidence that the waste has not changed and that errors in shipment are unlikely. Only then will we accept the possibility that the originally collected samples were not representative or that laboratory analyses may have been in error. The shift supervisor will then consult with the laboratory director on the advisability of resampling and reanalyzing the waste as opposed to simply rejecting the shipment.

5.3.6.2 Example--Existing Onsite Containers--

This example is provided to illustrate certain components of a waste analysis plan for an existing onsite facility which stores wastes in containers. It is less comprehensive that the first example partly because waste analysis plans for onsite facilities will generally be more straightforward and concise than for offsite facilities. This is envisioned because onsite facilities will typically handle one waste type which they have experience handling and whose characteristics they know fairly well. In the following example, we have highlighted components of the waste analysis plan which support the specific facility standards of Subpart I, Use and Management of Containers. The example is intended to illustrate how related standards would be supported in waste analysis plans for other facility types. The components addressed in the example include:

- Waste Analysis Parameters and Rationale for Selection
- Procedures for Reviewing and Repeating the Initial Waste Analysis
- Procedures for Characterizing Collected Leaks, Spills, and Runoff
- Procedures for Assuring Compatibility of Wastes with Container Materials and Equipment
- Procedures for Assuring Compatibility of Wastes with Water Residues in Previously Used Unwashed Containers
- Procedures for Documenting Waste Ignitability
- Procedures for Assuring Container and Equipment Decontamination at Closure

Other components that would be required in an actual waste analysis plan for such a facility include overall quality assurance procedures and specific sampling and analytical methods.

5.3.6.2.1 Waste Analysis Parameters and Rationale for Selection--The ABC Company in Akron, Ohio is a chrome leather tanning operation. Our plant conducts "through the blue tanning" wherein we process raw and cured hides into the blue tanned state but do not conduct retanning or wet finishing. We store solid wastes (more than 90 percent solids) generated in the process in eight butyl rubber lined portable containers that are picked up and transported to an offsite landfill once every 6 months. The solid wastes are a mixture of chrome trimmings, shavings, and buffing dust. The wastes result from manual trimming, shaving, and sanding of chrome tanned hides and contain high concentrations of chromium and lead. Results of EP toxicity testing have indicated the following concentrations of chromium and lead:

chromium	35 ± 6 mg/l
lead	17 ± 10 mg/l

[Note: In an actual plan of this type, the applicant should incorporate a diagram to illustrate the waste generating process and its interrelationship with the waste storage containers.]

For the past 18 months we have been shipping these waste containers to the DEF landfill in West Akron. As part of our agreement with the disposal facility and to check the consistency of the waste stream (higher concentrations of chromium and lead are indicative of process upsets, use of excessive chromium, or still other problems which represent economic loss), we collect and analyze two replicate samples from each container once per month and one week before shipment. The samples are analyzed in our fully equipped laboratory (constructed and operated to assure proper operation of our wastewater treatment plant) using the extraction procedure and the leachate is analyzed using atomic absorption spectrometry for chromium and lead.

We test an aliquot of each raw solid sample to determine percent solids content and we use the paint filter method (47FR8311) to determine the presence of free liquids. The DEF landfill will not accept wastes containing free liquids nor waste solids with a moisture content more than 10 percent.

We maintain all analytical data in our operating record and report the latest analytical results on the manifest form accompanying each waste shipment to DEF.

5.3.6.2.2 Procedures for Reviewing and Repeating the Initial Waste Analysis--As noted, we analyse replicate samples from each waste container once per month and one week before shipment. On a daily basis, we visually check the containers to assess separation of the solid and liquid phase which, based on past experience, indicates a liquid content of greater than 10 percent. If we find this condition, we mix sand with the waste to assure the absence of free liquids upon delivery to the DEF landfill. We also reanalyze the waste on a contingent basis if we notice any fumes or haze in the vicinity of the containers or if we perceive uncharacteristic odors during our daily inspection.

5.3.6.2.3 Procedures for Characterizing Collected Leaks, Spills, and Runoff--The container area is diked and the container lids are closed except when wastes are added. We generally experience no leaks, spills, or runoff. However, if and when we do, we will collect three representative samples of resulting liquids as soon as we can gain safe access after the event. We will test the samples for chromium, lead, pH, TOC, and total solids. If acceptable, the waste liquid will be pumped to our onsite wastewater treatment facility for treatment. If unacceptable, we will notify Haz Clean in West Akron, a local spill control company.

> [Note: In an actual plan of this type, it would be appropriate to fully describe the treatment process, its permit status, and note the tolerance bands for the noted constituents to determine their acceptability for treatment.]

5.3.6.2.4 Procedures for Assuring Compatibility of Wastes with Container Materials and Equipment--We store and transport our solid waste (more than 90 percent solids) in containers lined with butyl rubber. Butyl rubber is used because of its strong resistance to abrasion and to acids and bases. It is chemically compatible with the solid wastes produced, i.e., no ignition, no corrosion, and no reactions ensue from normal handling procedures employed at ABC Company.

As further proof of waste/liner compatibility, we are submitting herewith raw test data from conducting EPA Test Method 9090 on two specimens of the butyl rubber over a 4-month period. The specimens were suspended in tubs containing waste leachate generated using the extraction procedure. Before and after immersion we tested these samples for tear strength and resistance, puncture resistance, other tensile properties, and hardness. You will note from the raw test data that the only significant difference noted after the 4-month period was the butyl rubber hardness. However, we have tested butyl rubber in the presence of rainwater with a pH of 4.8 (close to the EP pH) and have noted the same changes in hardness. Since we typically keep the container lids closed, we are confident that the container liners are fully compatible with the contained wastes.

> [Note: In an actual plan of this type, raw test data should be provided along with a diagram of the test apparatus, and a description of the test procedures.]

On a weekly basis, we visually inspect the container lining. A check is made for holes, pock marks, creases, abrasion or other signs of deterioration. Containers which have defects are relined or discarded. On a quarterly basis, tests are conducted to determine the presence of other metallic compounds. We use the extraction procedure to generate a leachate and analyze the leachate for priority pollutant metals using ICAP.

5.3.6.2.5 Procedures for Assuring Compatibility of Wastes with Waste Residues in Previously Used Unwashed Containers--When the containers are returned from the DEF landfill, we visually inspect them to assure that no residuals are visible and that the interior container surfaces are completely dry. As part of our agreement with DEF, any containers found to contain residual material are returned to the landfill, cleaned and rinsed, and returned to us within 24 hours, all at DEF's expense. Each container has an index number associated with it; thus, the previous constituents are known and control is exercised over unauthorized use of the containers. Since our process generates a fairly consistent solid waste, incompatibility is generally not a consideration.

5.3.6.2.6 Procedures for Documenting Waste Ignitability--Based upon historical information, operating experience, and data, we are confident that the wastes handled at the ABC Company are not ignitable under the guidelines established under 40 CFR 261.21(a). On a quarterly basis, however, flash point testing is conducted as a precautionary measure. One representative sample is taken from each container for flashpoint testing.

5.3.6.2.7 Procedures for Documenting Waste Reactivity--During our quarterly testing, in addition to measuring waste flash point, we also test for water reactivity and the presence of cyanides or free cyanides. We conduct these tests to determine the likelihood of toxic fume generation in the event of accidental contact of water with the stored wastes.

5.3.6.2.8 Procedures for Assuring Container and Equipment Decontamination at Closure--At closure, we will analyze samples of container rinse water to determine that the containers are decontaminated. Two samples representative of rinsings from each container will be subjected to EP toxicity testing to measure the concentration of chromium and lead. If the results are below the EP toxicity limit of 5 mg/l for each metal, we will consider the containers decontaminated and suitable for disposal or other uses. If the EP toxicity limits are not supported we will follow one of two alternative procedures. In all likelihood we will ship the containers to DEF or another licensed hazardous waste landfill for crushing and disposal. Otherwise, we will fully rinse the containers clean, collect the rinse water in the container dike area, and analyze the collected liquid as if it were a leak or spill. If the analytical results are within required tolerance limits, we will treat the collected rinse water in our wastewater treatment facility.

[Note: In an actual plan, these tolerance limits should be specified.]

5.3.7 List of Major Points

This subsection acts as a summary and will be useful to you in assuring the completeness of your submittal. It can be used to help plan, prepare, and check the adequacy of your submitted waste analysis plan. The listings are organized according to the following topics:

- General
- Offsite Facilities
- Onsite Facilities
- Containers
- Tanks
- Surface Impoundments

- Waste Piles
- Land Treatment
- Landfills

5.3.7.1 General--

Your submitted waste analysis plan should explain the following factors and procedures, regardless of your facility type, to demonstrate compliance with the general standards of §264.13:

- Procedures and methods to obtain waste analysis data and develop all information necessary to treat, store, or dispose of the waste.
- Plan for and frequency of reviewing and repeating initial waste analyses
    - on a routine basis, and
    - on a contingent basis when the waste generating process changes, when the waste changes, or when the waste is suspected to have changed based on visual inspection or other routine testing.
- Parameters analyzed for in each waste.
- Rationale for selecting waste analysis parameters.
- Analytical test methods used.
- Representative sampling methods including number of samples; grabs, composites; timing of sample collection, and related information.
- Waste analysis results and information provided by generators (for onsite facilities, the waste analysis information you provide in your application will fulfill this requirement).
- Waste analysis procedures and methods for waste ignitability, reactivity, or incompatibility.
- Methods of quality assurance and quality control including consideration of the following factors, certain of which may be applicable in specific instances only:
    - QA Organization and Responsibilities
    - Representative Sampling Procedures
    - Chain of Custody Procedures and Documentation
    - Instrument Calibration Procedures

  - Analytical Procedures
  - Data Analysis, Validation, Reporting, and Recording Procedures
  - Internal QC Checks
  - Performance and System Audits
  - Preventitive Maintenance Procedures and Schedules
  - Specific Procedures to Routinely Assess Precision, Accuracy, Completeness, Compatibility, and Representativeness
  - Corrective Action

It is recommended that you include:

- schematic diagrams whenever possible,
- summary charts, ta[illegible]s, and figures whenever possible.

5.3.7.2 Offsite Facilities-

Your submittal must demo[illegible] procedures and methods covering the following waste analysis factors and components:

- Initial Waste Characterization
  - submit information provided by the generator including completed questionaires
  - provide blank questionnaires if your facility is new and you have not yet received such information
  - define generator visit, audit, inspection, or other survey procedures and examples of existing results
  - note whether generator or your personnel collect the samples
  - indicate selected waste analysis parameters and rationale for selection
  - identify and describe representative sampling methods
  - specify analytical test methods for each waste and measured component
  - identify the laboratory that conducts the analyses
  - note procedures for reviewing and repeating the initial waste analyses, on a routine basis and on a contingent basis

  - identify procedures and agreements for receiving prior notice from generators of changes in the waste generating process or in other procedures which would or could change the nature of the waste
  - identify waste analysis procedures and methods for determining waste compatibility, including:
    - methods to show compatibility with other wastes
    - methods to show compatibility with equipment surfaces
    - methods to show compatibility with liners and leachate collection systems, and
    - methods to show waste treatability if the treated waste is considered non-hazardous after treatment
  - note procedures for specifying allowable ranges on waste constituent concentrations
  - identify procedures for rejecting wastes with component concentrations outside of the established tolerance levels or for rejecting otherwise restricted wastes
  - describe all quality assurance and quality control procedures

- Screening of Incoming Waste Movements
  - indicate waste analysis procedures for determining consistency between waste and manifest
  - specify analytical parameters and rationale for selection
  - indicate procedures for documenting that selected tolerance bands are supported
  - describe nonanalytical waste characterization procedures such as visual inspections
  - indicate procedures for identifying restricted wastes
  - indicate procedures for identifying discrepancies in the number of drums or in the weight or volume of bulk waste movements
  - fully define representative sampling procedures including identification of samples taken in grab or composite fashion; the number of samples taken; use of random sampling or sampling of all discrete waste units

- Evaluation of Waste Movements and Associated Analytical Results
  - identify sampling, analytical, and decision team personnel
  - define criteria and circumstances for waste acceptance, rejection, or reevaluation
  - define documentation and recording procedures
  - define procedures implemented during and after decision to reject a waste
  - document waste unloading procedures after waste acceptance

5.3.7.3 Onsite Facilities--

- Initial Waste Characterization
  - describe waste production processes including raw materials, end products, and other intermittent sources of waste
  - identify historical or published information on the waste
  - identify waste parameters for analysis and rationale for selection
  - identify any tolerances or other restrictions on waste constituents
  - waste analysis procedures and methods for ignitable, reactive, or incompatible wastes
  - representative sampling methods, including identification of samples taken in grab or composite fashion; the number of samples taken, use of random sampling or sampling of all discrete waste units
  - analytical procedures
  - indicate procedures for reviewing and repeating initial waste analyses on a routine basis and a contingent basis
  - identify procedures for waste handling if waste analyses indicate conditions outside of established tolerance bands or the presence of restricted constituents or wastes
  - describe all quality assurance and quality control procedures

5.3.7.4 Containers--

Waste analysis plans for storage of containers must address the additional specific requirements listed below:

- procedures to assure and document compatibility of waste and container
- procedures to characterize accumulations in containment systems
- procedures to detect free liquids
- procedures to identify ignitable, reactive, and incompatible wastes
- procedures to determine if containers which previously held wastes are contaminated with wastes not compatible with present wastes
- procedures to demonstrate decontamination at closure

5.3.7.5 Tanks--

- procedures to assure and document compatibility of waste and tank
- procedures to identify ignitable, reactive, and incompatible wastes
- procedures to document that tanks have been sufficiently washed of previously held wastes if new wastes would be incompatible with residual wastes
- procedures to demonstrate decontamination at closure

5.3.7.6 Surface Impoundments--

- procedures to assure and document compatibility of wastes and leachates with liner materials
- procedures to identify ignitable, reactive, and incompatible wastes
- procedures to demonstrate decontamination at closure, residual contamination at closure, or the absence of free liquids if wastes are solidified at closure

5.3.7.7 Waste Piles--

- procedures to detect the presence of liquids or free liquids
- procedures to assure and document compatibility of wastes and leachates with liner and leachate collection system materials

- procedures to identify ignitable, reactive, and incompatible wastes
- procedures to demonstrate that bases have been decontaminated of previously stored wastes which would be incompatible with new wastes
- procedures to demonstrate decontamination at closure or residual contamination at closure

5.3.7.8 Land Treatment--

- procedures to obtain waste analysis data for Appendix VIII constituents as part of the treatment demonstration
- waste analysis procedures selected to allow for control of soil pH, enhancement of soil/waste reactions, and control of soil moisture
- procedures to identify Appendix VIII constituents in or derived from wastes for facilities growing food chain crops
- procedures to quantify cadmium concentration in waste and the pH of the waste/soil mixture
- procedures to identify ignitable, reactive, and incompatible wastes

5.3.7.9 Landfills--

- procedures to assure and document compatibility of wastes and leachates with liner and leachate collection system materials
- procedures to identify ignitable, reactive, and incompatible wastes
- procedures to detect the presence of liquids or free liquids in wastes or free standing liquids in waste containers
- procedures to demonstrate that wastes in lab packs are compatible with inside containers
- procedures to assure and document compatibility of containerized wastes and added absorbents
- procedures to determine whether waste in lab packs are sulfide and cyanide bearing wastes

5.3.8 References

1. U.S. Environmental Protection Agency. Background Document for 40 CFR Parts 264 and 265, Subpart B--General Facility Standards. Section 264.13--General Waste Analysis and Section 265.13--Interim Status Standards for General Waste Analysis. U.S. EPA Office of Solid Waste, January 12, 1981.

2. U.S. Environmental Protection Agency. Test Methods for Evaluating Solid Waste. Physical/Chemical Methods. SW-846. Second Edition. July 1982.

3. Ford, P. J., P. J. Turina, and D. E. Seely. Characterization of Hazardous Waste Sites--A Methods Manual. Volume II--Available Sampling Methods. Prepared for Lockheed Engineering and Management Services under EPA Contract No. 68-03-3050. Environmental Monitoring Systems Laboratory, Office of Research and Development, U.S. Environmental Protection Agency. March 1983.

4. U.S. Environmental Protection Agency. Samplers and Sampling Procedures for Hazardous Waste Streams. U.S. EPA Municipal Environmental Research Laboratory. Cincinnati, Ohio. EPA-600/2-80-018.

5. A. T. Kearney, Inc. Final Report under Contract No. 68-01-6515, Work Assignment R01-007. Prepared for the U.S. Environmental Protection Agency. December 1982.

6. Correspondence from GCA Corporation, GCA/Technology Division to U.S. EPA Region II, Office of Hazardous Waste Response. November 17, 1981.

7. Spannagel, U., R. Whitney, and D. Wolbach. Field Scheme for Determination of Waste Reactivity Groups. Prepared by Acurex Corporation for the U.S. Environmental Protection Agency. Presented in the Proceedings of the Ninth Annual Research Symposium--Land Disposal, Incineration, and Treatment of Hazardous Waste. Fort Mitchell, Kentucky. May 1983.

8. Hatayama, H. K., et al. A Method for Determining the Compatibility of Hazardous Wastes. Prepared for the U.S. Environmental Protection Agency, Municipal Environmental Research Laboratory by the California Department of Health Services. EPA-600/2-80-076, April 1980. (Currently under review and revision by the American Society of Testing and Materials.)

5.4 SECURITY

5.4.1 Regulatory Citations

Information on security must be included in Part B of the permit application, as specified in:

> "§270.14(b)(4) A description of the security procedures and equipment required by §264.14, or a justification demonstrating the reasons for requesting a waiver of this requirement."

The regulatory requirements regarding security are contained in §264.14. They are:

> "§264.14 Security.
>
> (a) The owner or operator must prevent the unknowing entry, and minimize the possibility for the unauthorized entry, of persons or livestock onto the active portion of his facility, unless he can demonstrate to the Regional Administrator that:
>
> (1) Physical contact with the waste, structures, or equipment within the active portion of the facility will not injure unknowing or unauthorized persons or livestock which may enter the active portion of a facility; and
>
> (2) Disturbance of the waste or equipment, by the unknowing or unauthorized entry of persons or livestock onto the active portion of a facility, will not cause a violation of the requirements of this Part.
>
> (b) Unless the owner or operator has made a successful demonstration under paragraphs (a)(1) and (a)(2) of this Section, a facility must have:
>
> (1) A 24-hour surveillance system (e.g., television monitoring or surveillance by guards or facility personnel) which continuously monitors and controls entry onto the active portion of the facility; or
>
> (2)(i) An artificial or natural barrier (e.g., a fence in good repair or a fence combined with a cliff), which completely surrounds the active portion of the facility; and
>
> (ii) A means to control entry, at all times, through the gates or other entrances to the active portion of the facility (e.g., an attendant, television monitors, locked entrance, or controlled roadway access to the facility).
>
> (c) Unless the owner or operator has made a successful demonstration under paragraphs (a)(1) and (a)(2) of this Section, a sign with the legend, "Danger--Unauthorized Personnel Keep Out," must be posted at each entrance to the active portion of a facility, and at other locations, in sufficient numbers to be seen from any approach to this active portion. The legend must be written in English and in any other language predominant in the area surrounding the facility (e.g., facilities in counties bordering the Canadian province of Quebec must post signs in French; facilities in

counties bordering Mexico must post signs in Spanish), and must be legible from a distance of at least 25 feet. Existing signs with a legend other than "Danger--Unauthorized Personnel Keep Out" may be used if the legend on the sign indicates that only authorized personnel are allowed to enter the active portion, and that entry onto the active portion can be dangerous."

5.4.2 Guidance to Achieve the Part 264 Standards

5.4.2.1 General--

The intent of the §264.14 requirements is to keep unauthorized people and livestock out of the active portion of the facility. In order to comply with the requirements of §264.14, you must:

- Prevent unknowing entry of persons or livestock to active portions of the facility.
- Minimize unauthorized entry of persons or livestock to active portions of the facility.

In order to qualify as adequate, the security measures described in your application must include:

- A 24-hour surveillance system and signs around the active portion of the facility, or
- Artificial or natural barriers with controlled access points and signs around the active portion of the facility.

However, you may request a waiver of these requirements if you can make a demonstration in Part B of your permit application that unknowing or unauthorized persons or livestock would not injure themselves or cause a violation of your permit upon entering the active portion of the facility (see §264.14(a)(1) and (2)). Additional information on exemptions or waivers is presented later in this discussion.

5.4.2.2 Surveillance System or Barrier and Controlled Access--

As indicated in §264.14(b), the security procedures and equipment must provide a means for controlling entry to the active portion of the facility. The intent is that there should be a finite number of entrances into the facility and that attempted or inadvertent entry to the facility at points other than the identified, controlled entrances will be physically hindered or, at least, immediately identified.

If some type of 24-hour surveillance system is or will be utilized to monitor and control entry to the active portion of the facility, the permit application should describe it in detail. All related structures and equipment should be indicated on a plot plan. All facets of the system, including personnel, procedures, structures, and equipment used should be described, and if possible, demonstrated on the plot plan.

Example:

"Security at this Company is maintained by a staff of trained security guards, who primarily monitor entry and exit from the active portion of the facility and provide security measures within the plant premises. The only authorized entry point is at the east end of the facility. Personnel and vehicle entry at that point are controlled by gates operated by remote control from the guard house. The guardhouse is occupied by two armed guards 24 hours a day, 7 days a week, except during plant shutdowns for holidays, at which time the gate remains locked and only one guard is on duty. Guards normally work an 8-hour shift with a crew of six guards per day. There is a six-foot high chain-link fence along the entire eastern side of the facility. There are no physical barriers on the north, south and west sides of the facility. Once each hour, a guard walks the entire facility perimeter and makes a walkthrough of the facility. The security facilities and the guard's patrol route are shown on plot plan xyz."

If a fence or wall is used to control entry, the height, type of material and any locking devices should be presented in the permit application. The procedures and equipment used to control entry must be presented in your application, and, if appropriate, a description of any natural barriers should be provided.

Examples:

- Barrier. A 7-foot high, chain-link fence with two lockable gates is constructed around the container storage area to restrict unauthorized entry and to prevent drums from being washed downstream in the event of a minor flood. (See plot plan xyz).

- Means to Control Entry. Entry to the facility is controlled by two armed guards stationed at the main entrance gate. Employees are required to show identification cards when reporting for work, and visitors and contractors entering the plant must sign a log sheet and obtain visitor passes. (See plot plan xyz).

- Use of Natural Barrier. The hazardous waste facility is located entirely within xyz's operating facility. The facility is enclosed by a fence and the Michigan River with limited access provided by 24-hour guarded gates. (See plot plan xyz).

Although §270.14(b) mentions specific equipment and procedures that must be part of security at a facility, the intent of §270.14(b)(4) is that all procedures and equipment which contribute to facility security should be described.

Example:

"In addition to the general security provisions of fencing, gates, and guards, several other features contribute to the safety and security of the facility. Ample lighting is provided throughout the site, and guards and operators are equipped with hand-held, two-way radios to report upset conditions immediately. In addition to the two-way portable radios carried by guards and operators, a base station for the public address system is located in the plant manager's office. An internal telephone system (with phones in most plant areas) is provided. The same telephone system is used for communication outside the plant."

It is important to note that the requirements of §264.14(b) are satisfied if the active portion is located within a facility or plant which itself has a surveillance system, or a barrier and a means to control entry, which complies with the requirements of §264.14(b). Thus, a separate security system around only the active portion may not be required. However, the requirements for signs around the active portion, as discussed below, would still be applicable.

5.4.2.3 Signs—

Regardless of the methods employed to limit entry to the active portion of the facility, the owner or operator must post signs in accordance with the requirements of §264.14(c). There are four requirements for any signs. They are:

- A legend which makes it plain that unauthorized persons are in danger and are not allowed into the active portion of the facility.
- Legibility from a distance of at least 25 feet.
- Visibility from any approach to the active portion of the facility.
- Legend in English and in any other language predominant in the area surrounding the facility.

In §264.14(c), the legend "Danger-Unauthorized Personnel Keep Out" is suggested. However, any legend that makes it clear that danger exists and entry authorization is required is acceptable. A sign with a symbol alone is not sufficient, a written legend is also necessary.

The legibility of any sign will depend on the viewing conditions and the size and shape of the letters. A reputable industrial safety sign manufacturer is likely to be your best source of information on the legibility of a particular sign or legend at 25 feet. The American National Standards Institute's standard ANSI Z35.1 "Specifications for Industrial Accident Prevention Signs" may also be of assistance. The sign colors, dimensions, and the height of the letters on the proposed signs should be identified in the application. If the stroke-to-width ratio of the letters is available it should be considered for inclusion in the application.

The signs should be placed at all entries to the active portion of the facility. In addition, they should be placed at intervals around the perimeter of the active portion such that they are visible from all angles of approach. The spacing and location of the signs should be stated in the permit application.

The need to include the legend on the sign in a language other than English will depend on the predominance of another language in the area of the facility. The posting of two signs in different languages close together is acceptable, provided that they both meet the legibility and visibility criteria. Facilities in counties bordering Quebec Province are required to choose French as the second language and those bordering Mexico must choose Spanish. In some areas, it may be necessary to post signs in English and more than one other language.

Example:

"The signs to be posted will bear the legend 'Danger - Unauthorized Personnel Keep Out'. They are diamond-shaped and measure 10 inches on each side. The letters will be two inches high and will be red on a reflective white background. The manufacturer estimates they are legible in daylight at distances to 50 feet. Identical signs bearing the same legend in French will be posted next to each English sign. The signs will be posted at each vehicle and personnel access point and attached to the facility perimeter fencing at corners and at 75-foot intervals (see plot plan xyz)."

5.4.2.4 Exemptions/Waivers--

The provisions of §264.14(a) provide that you may request an exemption/waiver from the security provisions in §264.14(b) and (c). If you believe a waiver of any of the requirements of §264.14 is appropriate, you must demonstrate that unknowing or unauthorized persons or livestock would not injure themselves or cause a RCRA violation upon entering the active portion of your facility. Both these points may be demonstrated by showing that the nature and duration of the hazard potential from the hazardous waste on site does not warrant the required security procedure or equipment. In addition, if you can show that your facility provides certain features, such as cover materials or containers, that would prevent contact with equipment or structures, certain security procedures and equipment might not be needed. Finally, a waiver justification could show that safety or operating practices related to equipment and structures would eliminate the potential for an intruder to cause a spill, mix incompatible wastes, ignite ignitable wastes, damage containment or monitoring systems, etc. The circumstances under which a waiver will be granted are limited.

The following are two examples of facility scenarios where a waiver of security has been requested.

Example 1:

The permit applicant has stated that the landfill does not have a security system and has requested a waiver from that requirement. The following reasons have been provided as justification in support of the request;

- Landfill is in a remote, relatively unpopulated region.
- Six inches of cover material is applied daily.
- Wastes are toxic as determined by the extraction procedure (EP) of Appendix II, 40 CFR 261, with greater than 100 times the drinking water standard of chromium.
- Precautions have been taken at the facility to protect equipment and structures from unauthorized operation or tampering.

It is likely that the EPA would judge this demonstration to be inadequate. Although the facility is located in a remote area, the potential still exists for a person or animal to gain access to the active portion of the facility. Such unauthorized entry may be unlikely to result in injury, since chromium is not usually toxic on contact. However, the potential exists for the disturbance of cover materials, resulting in a hazard. This would indicate the potential for violation of the permit. The facility could be required by the Regional Administrator to install adequate security or increase depth of cover.

Example 2:

The permit applicant has stated that the waste pile does not have a separate security system, only the security system for the plant as a whole, and has requested a waiver from the requirement for a security system. The following reasons have been provided as justification in support of the request:

- Waste pile is located onsite at a chemical manufacturing complex.
- Waste pile is covered by a secured tarpaulin.
- Physical analysis shows that waste dries to a consolidated, concrete-like mass.
- Precautions have been taken at the facility to protect equipment and structures from unauthorized operation or tampering.

In this case, it is likely that EPA would judge the demonstration to be adequate. Although unknowing or unauthorized entry to the waste pile has not been prevented, physical contact with the waste material would be unlikely to result in injury of the intruder. Further, due to the consistency of the waste, it is unlikely that tampering with the tarpaulin covering the material will result in violation of standards.

For your convenience, Table 5-14 provides examples of criteria for determination of exemption.

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TABLE 5-14. CRITERIA FOR A DETERMINATION OF EXEMPTION

Category	Favorable Factors for Exemption	Principal Tools for Determination	Areas of Judgement
Determination of Hazard to Intruder	Physical contact with waste will not result in injury	Review of chemical and physical analyses of waste sample Identification of hazard properties of waste based on available literature Determination of length of time waste is hazardous	Evaluation of class of hazard and degradation
Determination of Risk of Violating Other Standards	An intruder could not cause a spill	Review of permit application for conditions such as: waste consists of a solidified and relatively immovable mass, or waste containers are securely sealed and valves are protected from tampering	Determination that intruder actions would not result in a violation
	An intruder could not mix incompatible wastes nor ignite ignitable wastes	Review of permit application for conditions such as: the absence of these types of wastes at the facility, or ignitable wastes are covered in a manner that would prevent contact with ignited materials such as matches or cigarettes	
	An intruder could not damage containment or monitoring equipment in a manner that would cause a violation	Review of permit application for conditions such as: inaccessibility of structures to intruders, protection of monitoring equipment by locked housing	
	General inaccessibility of wastes relating to management strategy (e.g., deep burial, covered tank)	Review of permit application to determine the presence of natural and man-made barriers	Evaluation of the probable effectiveness of barriers in preventing physical contact with wastes
	Vehicles and structures are protected from unauthorized operation or tampering	Review of permit application for safety practices, such as locking of vehicle ignitions or storage of vehicles in locked garages	Determination that contact with equipment or structures would not result in intruder injury or violation of standards

5.4.2.5 Post-Closure Security--

Subpart G of Part 264 contains security requirements at disposal facilities during the post-closure period in §264.117(b). All applicants should read those requirements to determine if they are applicable to their facility. Post-closure security requirements should be addressed in the post-closure plan required by §264.118.

5.4.3 List of Major Points

1. Which option under §264.14(b)(1) or (2) will be used?

   (a) Where is the gate or barrier with means to control entry? How is barrier situated in relation to the active portion of the facility? Provide plans.

   (b) If 24-hour surveillance is used, describe in detail. Provide plans.

2. Where are the Danger Signs posted - in what language, are they described? (§264.14(c))

3. Will any other security procedures be used e.g., lights, dogs, etc. (§270.14(b)(4))

4. If applying for a waiver, was a case made to demonstrate compliance with §264.14(a)(1) and (2)?

Additional background discussion on the security requirements of §264.14 is available in the preamble on security in the May 19, 1980 Federal Register at page 33180.

5.5 INSPECTIONS

5.5.1 Regulatory Citations

Information on inspection schedules must be included in Part B of the permit application, as specified in:

> "§270.14(b)(5) A copy of the general inspection schedule required by §264.15(b); include where applicable; as part of the inspection schedule, specific requirements in §§264.174, 264.194, 264.226, 264.254, 264.273, 264.303, and 264.347."

The regulatory requirements regarding inspections are contained in §264.15(b) and, depending on the type of facility, additional requirements are in the sections of the regulations noted at the end of §270.14(b)(5). Although §270.14(b) references only paragraph (b) of §264.15, the entire §264.15, General Inspection Requirements, is presented below, since the requirements of all four paragraphs, (a) through (d), will have to be addressed in your inspection plan. The §264.15 regulatory requirements are:

> §264.15 General inspection requirements.
>
> (a) The owner or operator must inspect his facility for malfunctions and deterioration, operator errors, and discharges which may be causing--or may lead to--(1) release of hazardous waste constituents to the environment or (2) a threat to human health. The owner or operator must conduct these inspections often enough to identify problems in time to correct them before they harm human health or the environment.
>
> (b)(1) The owner or operator must develop and follow a written schedule for inspecting monitoring equiment, safety and emergency equipment, security devices, and operating and structural equipment (such as dikes and sump pumps) that are important to preventing, detecting, or responding to environmental or human health hazards.
>
> (2) He must keep this schedule at the facility.
>
> (3) The schedule must identify the types of problems (e.g., malfunctions or deterioration) which are to be looked for during the inspection (e.g., inoperative sump pump, leaking fitting, eroding dike, etc.).
>
> (4) The frequency of inspection may vary for the items on the schedule. However, it should be based on the rate of possible deterioration of the equipment and the probability of an environmental or human health incident if the deterioration or malfunction of any operator error goes undetected between inspections. Areas subject to spills, such as loading and unloading areas, must be inspected daily when in use. At a minimum, the inspection schedule must include the terms and frequencies called for in §§264.174, 264.194, 264.226, 264.253, 264.254, 264.303, and 264.347, where applicable.

> (c) The owner or operator must remedy any deterioration or malfunction of equipment or structures which the inspection reveals on a schedule which ensures that the problem does not lead to an environmental or human health hazard. Where a hazard is imminent or has already occurred, remedial action must be taken immediately.
>
> (d) The owner or operator must record inspections in an inspection log or summary. He must keep these records for at least three years from the date of inspection. At a minimum, these records must include the date and time of the inspection, the name of the inspector, a notation of the observations made, and the date and nature of any repairs or other remedial actions.

The EPA will evaluate your inspection schedule along with the rest of your inspection plan and your entire Part B submittal to insure that it adequately protects human health and the environment. As part of that review, EPA may request modification or amendment to the inspection schedule, as may be necessary.

5.5.2 Guidance to Achieve the Part 264 Standards

5.5.2.1 General—

The intent of the §264.15 requirements and the facility-type specific requirements on inspections is to insure that all owners and operators have identified key pieces of equipment and areas of their operations where scheduled inspection will minimize equipment failure which could lead to endangerment of public health or the environment. By requiring the development and submittal of an inspection schedule, the Agency intends to insure that all hazardous waste facilities are closely monitored by their owners and operators so that they will continue to function as designed throughout the active lives and, when applicable, the post-closure periods.

In order to comply with the requirements of §264.15(b) you must;

- Have and follow a written inspection schedule.
- Keep the schedule at your facility.

In order to qualify as an adequate inspection schedule your submittal must;

- Identify the specific equipment to be inspected.
- Identify how each item will be inspected.
- Contain a justifiable frequency for inspecting each item.
- Contain a schedule for additional inspections required by the regulations depending on the type of facility you are operating.

The additional inspection requirements for specific types of facilities can be found in the sections listed at the end of §264.15(b)(4). They are;

§264.174 - Inspection of Containers

§264.194 - Inspections of Tanks

§264.226 - Inspections of Surface Impoundments

§264.253 - Inspections of Waste Pile Liners

§264.254 - Inspections of Waste Piles

§264.303 - Inspections of Landfills

Although not specifically called out in §264.15(b)(4), there are additional inspection requirements for Land Treatment facilities. Those requirements are specified under §264.273, Design and Operating Requirements, in paragraph (g) of that section. If you are requesting a permit for a land treatment facility you must address the requirements of §264.273(g) in your inspection plan. Additional inspection requirements for incineration facilities are contained in §264.347. However, the Agency plans to discuss those requirements in detail in a separate document.

Possibly the easiest and most straightforward way to satisfy the inspection schedule requirements is to develop an inspection plan in total in the form that it will be implemented and include it with your permit application submittal. In this way you will not only comply with the requirements of §270.14(b)(5), but you will also demonstrate compliance with all of the §264.15 requirements.

Developing a Schedule--The first step in developing a schedule is identification of all equipment, devices, and structures that will be inspected. Identification can be organized either by equipment type (safety equipment, security devices, monitoring equipment) or by facility operating area (receiving area, treatment area, office area) or both. If you are grouping strictly by types of equipment, remember that areas of the facility that have no equipment, such as roadways or other traffic areas, must be inspected. Table 5-15 is a list of equipment and operating areas that will typically be a part of any hazardous waste management facility. Use that list as a starting point and add equipment, devices, structures, and areas specific to your facility. The list is by no means exhaustive. It is intended to guide your thinking of the types of equipment or areas that should be identified and provide examples of the detail desired in your submittal. Further, the listing of items under topical headings in the table is not meant to define the item. You should organize your presentation in the most lucid manner that is representative of your facility.

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TABLE 5-15. EQUIPMENT, STRUCTURES, AREAS TO BE CONSIDERED FOR INCLUSION IN AN INSPECTION SCHEDULE

Safety Equipment

Emergency Shower/Eyewash
Face Shields
Protective Glasses
Disposable Respirators
First Aid/Equipment Supplies
Protective Clothing
Gas Masks
Chemical Respirators
Signs

Monitoring Equipment

Liquid Level Transmitters
Conservation Vents
Leak Detection System
Fire Detection System
Ground Water Monitoring System
Liquid Meters

Mobile Equipment

Tires/Tracks
Brakes
Hydraulics
Trailer Hitches
Lights-Running/Emergency
Horns/Sirens
Engine Conditions

Structures

Dikes
Berms
Ramps
Lifts (Elevators)
Tank Supports
Bases/Foundations
Roofs
Walls

Emergency Equipment

Fire Blankets
Fire Extinguishers
Fire Alarm System
Generators
Emergency Lights
Portable Pumps/Hoses
Fire Fighting Wagon/Hoses
Self-Contained Breathing Apparatus
Absorbents
Containment Booms

Security Equipment

Fences-Facility/Area
Signs
Gates
Lighting
Locks

Areas

Loading Area
Unloading Area
Storage Area
Main Roadways
Gate Areas
Periphery

Communication Equipment

Telephones
Radios
Intercoms
Public Address System
TV Monitoring System

The detail with which you identify equipment to be inspected is very important. For example, suppose you have a pump mounted on a trailer that will be used to transfer hazardous liquids in the event of an emergency. The statement "check mobile emergency pump" is likely to be judged inadequate. However, if you list specific parts of the apparatus that should be checked under that heading, then you are providing the detail expected. An example of the necessary detail is presented below:

Check mobile emergency pump

__ hitch operable

__ tire inflation (between __ and __ lb)

__ inlet/outlet pump connections clean/operable

__ hose connections clean/operable

__ 5-10 ft lengths of inlet hose on trailer

__ 5-10 ft lengths of outlet hose on trailer

__ hose condition

__ motor to pump shaft connections

Additionally, if the pump is gasoline-powered; then checks of spark-plug condition and fuel tank level would be listed. For electric-powered, power cord condition and cord connector condition checks would be indicated, and so on. Other items which should be considered for inclusion in an inspection plan for all types of pumps include;[1]

- pump pad condition
- anchor bolt tightness
- pump/motor shaft alignment
- bearing temperatures
- electrical conduit integrity
- bearing oil reservoir level
- vibration/noise
- seals/packing integrity
- primary liquid availability

The above examples of items that should be considered for pump inspections are indicative of the level of detail that you should provide in an inspection plan for any equipment, device, or structure. In essence, the level of detail required in the inspection varies depending on the role of the equipment or area inspected. Emergency equipment, such as the example pump discussed above, should be thoroughly inspected to insure that it will perform its contingency action and, thus, prevent dangerous conditions. The detail required in inspection of noncontingency equipment will in many cases be as stringent, but generally not as detailed.

Inspection Procedures--Once you have identified all the equipment, structures, or areas to be checked during the inspections, the next step is to document how each item on the list is checked or inspected. Simply using words like "check" or "observe" is inadequate. Rather, use phrases such as "check _____ for _____ by _____" or "observe _____ for signs of _____". Using the mobile emergency pump as an example, the applicant should indicate in the inspection procedures;

- Check tires for proper inflation by using a tire pressure gauge and record the reading for each tire.
- Observe hose connections for signs of rust, corrosion, or dirt buildup that might prevent a tight connection.

Many structures or areas will not lend themselves to a quantitative measurement which is otherwise possible for a piece of mechanical equipment. In these cases, the inspection procedures should indicate a visual inspection, as a minimum, but be certain that the procedures state "what to look for" and, as specifically as possible, "where to look." Examples are;

- "Walk along the top of the dike. Look for erosion rivelets or slides on the slopes on either side. Look for signs of settling and unevenness along the top edge. Look for signs of liquids (puddles, dampness) on the sloping sides of the dike and especially along the flat surfaces at the bottom of the dike slope for a distance of _____ ft away from the bottom of the dike slope."
- "Walk along the roadway from the main gate to _____. Look at the roadway surface for signs of subsidence, bumps, holes, cracks or other signs of damage. Look for signs of spillage from vehicles, especially around turns and corners. Observe both edges of the roadway for materials that may have fallen from vehicles and collected there."

Inspection Frequencies--The next step in preparing an adequate inspection plan is determining a justifiable frequency for conducting the inspections of each item. The regulation (§264.15(b)(4)) states that the frequency "should be based on the rate of possible deterioration ... and the probability of an ... incident if the deterioration or ... operator error goes undetected between inspections." As will be discussed later, some of the facility-specific regulations set daily, weekly, or other periodic requirements for inspecting certain components of the facility. In general, equipment, structures, or areas that are subjected to daily or continual use or stress should be inspected more frequently than backup or emergency components. Items inspected less frequently should be subjected to more rigorous inspection. However, if the failure of equipment used continuously would pose a hazardous situation of any kind, the inspection should be rigorous, as well as frequent.

For example, a mobile emergency pump might receive a thorough inspection in an inactive mode once per month, while active pumps might be visually inspected once per day. Where an emergency pump might be tested in operation on a quarterly or semiannual basis to insure proper suction and discharge pressures and a nonleaking condition, active pumps might be so tested on a weekly basis.

Continual or frequent successful use of an area or equipment item does not substitute for inspection. For example, although plant communcations equipment may be used at the facility for paging or indicating work-breaks, that system should be inspected on a scheduled basis, if it will be used to signal emergency situations.

5.5.2.2 Inspections of Containers--

The owner or operator of any facility that stores containers of hazardous waste must, in addition to the inspection requirements of §264.15, comply with the inspection requirements of §264.174, which are;

> "§264.174 Inspections.
>
> At least weekly, the owner or operator must inspect areas where containers are stored, looking for leaking containers and for deterioration of containers and the containment system caused by corrosion or other factors."

These requirements are straightforward. They state that you must inspect the containers and their associated containment system every week. The regulation states what must be looked at (containers and containment system), the frequency (weekly), and, generally, what to look for (leaks and deterioration). You must, therefore, address these three concerns in your inspection plan, but you must also provide additional details specific to your facility. You should indicate the locations where the inspector will check for leaks and deterioration; whether the inspection will be visual, quantitative, or both; decision criteria for determining deterioration, and follow-up action in the event of such leakage or deterioration.

For example;

"Look at the concrete pad, check for cracks in the surface or curbs, flaking, chips or gouges and areas of wear. Check for liquid in the sump at the northeast corner of the pad."

Examples of the types of containers for which inspection procedures should be provided are drums, barrels, pails, railroad tank cars, tank trailers, and other portable containers. Examples of items that should be considered for inclusion in an inspection plan for containers include checks for:

- tightness of lids
- leaks in flanges
- high liquid level/overflow
- leaks in plug seals
- evidence of corrosion

Containers should be inspected before and during waste addition and storage. Examples of inspection items before waste addition include:

- wheels properly braked/chocked
- drain valves closed tight
- inside walls/compartment dividers free of corrosion
- overfilling controls operative
- containers located so as to minimize potential for external puncture

During their use to receive and store wastes at your facility, tank cars, tank trailers, and portable containers should be periodically inspected, not only for the above items, but also to the same extent as a stationary tank.

Storage areas for some types of containers will typically consist of an impermeable pad made of a material such as concrete. These pads should be included in the inspection plan. Procedures for inspecting them for chips, cracks, wear, or general deterioration which may increase their permeability are recommended for inclusion in the plan.

Further, if the container storage area is covered, your inspection procedures should include an examination of that cover. If there is mechanical equipment (e.g., a sump pump) it should also be included in the list of items to be inspected in the storage area.

The potential for leaks from containers depends on the waste material contained, the type of container, storage conditions, and length of storage time. The regulation requires inspections "at least weekly." More frequent inspections may be appropriate depending on the facility location, design, or operation. But there must not be more than 6 calendar days between inspection dates.

Finally, the provisions of §§264.15(c) and 264.171 require certain remedial actions if containers are found to be deteriorated or leaking during inspections. Applicants should be aware of these requirements.

5.5.2.3 Inspections of Tanks--

Any hazardous waste facility that uses tanks to treat or store hazardous wastes must, in addition to the inspection requirements of §264.15, comply with the inspection requirements of §264.194, which are;

> "§264.194 Inspections.
>
> (a) The owner or operator must inspect;
>
> (1) Overfilling control equipment (e.g., waste feed cut-off systems and by-pass systems) at least once each operating day to ensure that it is in good working order;
>
> (2) Data gathered from monitoring equipment (e.g., pressure and temperature gauges) where present, at least once each operating day to ensure that the tank is being operated according to its design;
>
> (3) For uncovered tanks, the level of waste in the tank, at least once each operating day, to ensure compliance with §264.192(b)(2);
>
> (4) The construction materials of the above-ground portions of the tank, at least weekly to detect corrosion or erosion and leaking of fixtures and seams; and
>
> (5) The area immediately surrounding the tank, at least weekly, to detect obvious signs of leakage (e.g., wet spots or dead vegetation).
>
> (b) As part of the inspection schedule required in §264.15(b) and in addition to the specific requirements of paragraph (a) of this Section, the owner or operator must develop a schedule and procedure for assessing the condition of the tank. The schedule and procedure must be adequate to detect cracks, leaks, corrosion or erosion which may lead to cracks or leaks, or wall thinning to less that the thickness required under §264.191. Procedures for emptying a tank to allow entry and inspection of the interior must be established when necessary to detect corrosion or erosion of the tank sides and bottom. The frequency of these assessments must be based on the material of construction of the tank, type of corrosion or erosion protection used, rate of corrosion or erosion observed during previous inspections, and the characteristics of the waste being treated or stored.
>
> (c) As part of the contingency plan required under Subpart D of Part 264, the owner or operator must specify the procedures he intends to use to respond to tank spills or leakage; including procedures and timing for expeditious removal of leaked or spilled waste and repair of the tank."

The requirements of §264.194(a) are; daily inspection of overfilling controls and monitoring equipment in all tanks, daily inspection of freeboard in uncovered tanks, weekly inspection of the tanks to detect leaks from fixtures and seams or corrosion/erosion of the tank materials, and weekly inspection of the surrounding area to detect obvious signs of leakage.

The provisions of §264.194(b) require you to develop a schedule and procedure that will provide a detailed inspection of the integrity of the tank. This requirement is in addition to the more cursory weekly tank inspection required by §264.194(a) and is indicative of the need for a thorough inspection of the tank walls and seams using appropriate instrumentation or gauges.

Storage tanks are similar to containers with respect to the items that should be included in an inspection plan. Thorough inspection for evidence of corrosion, which may lead to leaking, is particularly important. In addition, the inspection plan should provide that tanks will periodically be emptied and the interior walls and seams inspected for signs of deterioration. A detailed description of this procedure is important. The description should address where the waste will be placed when the tank is emptied, identify the type of equipment that will be used to conduct the inspection of the tank interior, and explain the inspection that will be conducted to insure that the tank is ready to be returned to service.

Pressure/vacuum vents, vent seals, roof drains, inlet/outlet connections, and seals are additional items that should be considered for inclusion in the inspection plan. Examples include;

- Determination of pressure/vacuum vent set-point
- Seating of vent seals
- Check for/remove foreign materials in roof drains
- Check inlets/outlets for blocking/corrosion
- Check seals on:
    - manholes
    - gauge hatches
    - inlet/outlet nozzles or flanges
    - weather shields
    - level gauges

Overfilling control systems will typically consist of some type of liquid level monitoring device with an output signal that is used to close an inlet valve, open a by-pass valve, or sound an alarm. In some cases, however, the overfilling control equipment may simply be a hook gauge, tape-and-plumb bob, or manometer which is periodically visually checked. The regulation requires daily inspection of these control systems to insure their proper operation.

The liquid level monitoring devices which provide a visual indication of liquid level can usually be visually inspected to insure that their mechanical parts are not binding or "hung-up". However, inspection checks of manometers may also include confirmation that the unit is level, checks for blockage, leaks and good seal connections on fluid lines, and confirmation of sufficient level in fluid wells. Periodic flushing of manometer fluid lines should also be considered for inclusion in the inspection schedule if warranted by service conditions.

The following are example items that could be included in inspections of float actuated liquid level sensing devices;

- check float for bouyancy/liquid infiltration
- check lever arm and interconnecting rods for integrity and freedom of movement.

Inspections of electronic level sensing units could include checking of wiring condition, probe position and condition, and condition of seals.[2] Periodic calibration and checks in accordance with manufacturer's recommendations should also be indicated in the inspection plan.

In cases where the liquid level sensor, regardless of type, provides a signal for valve control or alarm activation, the entire system must be inspected on a daily basis. The inspection plan should provide a detailed description of how this will be done and what items will be inspected. A clear description of how a false high liquid level indication will be input to the level sensor so that system operation can be confirmed is important. Other items that should be confirmed during the inspection include;

- system activated at proper preset level
- valves operated properly
- visual and audible alarms functioned properly
- there were no leaks in the system

The provisions of §264.15(c) require you to remedy any leak, crack, or wall thinning in violation of §264.191, or equipment malfunction in violation of §264.192, which you may discover as a result of your inspections. In addition, the provisions of §264.194(b) may require personnel to enter tanks during inspection. The Occupational Safety and Health Administration requirements relating to entry of tanks for inspection can be found at 29 CFR §1910.94(d)(11).

5.5.2.4 Inspection of Surface Impoundments--

Any owner or operator of a facility that uses a surface impoundment to treat, store, or dispose of hazardous waste must, in addition to the inspection requirements of §264.15, comply with the inspection requirements of §264.226, which are;

> "§264.226 Monitoring and inspection.
>
> (a) During construction and installation, liners (except in the case of existing portions of surface impoundments exempt from §264.221(a)) and cover systems (e.g., membranes, sheets, or coatings) must be inspected for uniformity, damage, and imperfections (e.g., holes, cracks, thin spots, or foreign materials). Immediately after construction or installation:
>
> (1) Synthetic liners and covers must be inspected to ensure tight seams and joints and the absence of tears, punctures, or blisters; and
>
> (2) Soil-based and admixed liners and covers must be inspected for imperfections including lenses, cracks, channels, root holes, or other structural non-uniformities that may cause an increase in the permeability of the liner or cover.
>
> (b) While a surface impoundment is in operation, it must be inspected weekly and after storms to detect evidence of any of the following:
>
> (1) Deterioration, malfunctions, or improper operation of overtopping control systems;
>
> (2) Sudden drops in the level of the impoundment's contents; and
>
> (3) The presence of liquids in leak detection systems, where installed to comply with §264.222; and
>
> (4) Severe erosion or other signs of deterioration in dikes or other containment devices.
>
> (c) Prior to the issuance of a permit, and after any extended period of time (at least six months) during which the impoundment was not in service, the owner or operator must obtain a certification from a qualified engineer that the impoundment's dike, including that portion of any dike which provides freeboard, has structural integrity. The certification must establish, in particular, that the dike:
>
> (1) Will withstand the stress of the pressure exerted by the types and amounts of wastes to be placed in the impoundment; and
>
> (2) Will not fail due to scouring or piping, without dependence on any liner system included in the surface impoundment construction."

The provisions of §264.226 require inspections at two distinct times; during and immediately after construction (paragraph(a)), and weekly during operation (paragraph (b)). In addition, paragraph (c) requires that a qualified engineer certify the unit's integrity before a permit will be issued or at any time that the impoundment has been out of service for 6 months or more.

The intent of paragraph (a) is to insure that both the materials and the construction of a surface impoundment comply with the plans which have served as a basis for granting a permit. Although the material suppliers and construction contractors will employ quality assurance procedures and tests, you must include provisions in your inspection plan for overseeing and reviewing the contractor or supplier procedures. The personnel you identify to conduct these inspections should represent only the owner's or operator's interests. The inspection procedures should include a statement of when, during construction, the inspections will be conducted and should provide for inspector approval before construction is allowed to continue. It may be necessary to identify multiple inspectors to insure that qualified personnel are conducting the inspections during the various construction phases.

Paragraph (a) of §264.226 specifically mentions liners and cover systems. However, any inspection plans submitted to comply with §264.226(a) should provide for inspection of materials and construction of all the various components of the surface impoundment. The following paragraphs offer examples of items that should be inspected during and immediately after construction.

Raw materials--All materials that will be used to construct the surface impoundment should be inspected upon receipt at the site. These include soils and aggregates, synthetic liner materials, pipes or trench materials, and any other materials that are purchased or delivered to the site. The material received should be compared to the shipping papers. Shipping papers should be compared to purchase orders and to the original plan specifications. Any tests that may be conducted on the materials, in addition to visual inspection, should be described. The inspection procedures should identify damaged shipping containers or wrappings. If only samples of a shipment will be inspected, justification of the representativeness of this procedure should be provided. If materials are to be stored, the storage area should be inspected before and during use, and all stored materials should be periodically inspected. Table 5-16 is an example inspection form which illustrates the type of information and level of detail that would constitute an adequate inspection plan.

Construction equipment and procedures--The inspection plan should provide for observation of surface impoundment construction. The equipment used and procedures of operation should be observed. As construction proceeds, the inspector should periodically check key dimensions of the impoundment (e.g., height and thickness of berms and dikes) as a check on the contractor's surveyor.

Post-construction inspections--Liner and cover systems are typically constructed of multiple layers. The inspection procedures should indicate that each of these layers will be inspected before any overlying layers are placed. The installation contractor should be conducting quantitative tests to confirm that the constructed layers meet design specifications. It is not necessary for the inspector to independently conduct these tests. However, the inspector should observe them being conducted and review the results in detail.

The portion of the inspection plan developed to comply with §264.226(a) should address the following topics; what will be inspected, when will it be inspected, what will be looked for, how will it be inspected, and what criteria establish failure and require corrective action. Table 5-17 is a summary list of example items that should be considered for inclusion in an inspection plan to satisfy §264.226(a). The items in the table are neither

TABLE 5-16. EXAMPLE RAW MATERIAL INSPECTION FORM

Name/Type __Screened and washed sand__

Quantity Received __100 cu yards__

Received In __10 Truckoads__ of __10 cu yards__ each

Shipping Papers: _X_ compared to material received

_X_ compared to purchase order

_X_ compared to plans specifications

Amount of Material Visually Inspected __All__

Samples Taken __3-from first, fifth, and last truckloads-all grab__

Sample Analysis Performed __Sieve on all three__

Analysis Results __________

_X_ Sent to Storage in __rear-equipment shed No. 5__

____ Sent to Site for Installation

Visual Inspection Results

Date	Location	Comments
4/8/83	Yard	Inspection at receipt-looked OK
4/15/83	Storage	Erosion losses noted-sand bagged circumference of pile
4/23/83	Site	Moved from storage-installed, looked OK--last load from each pile hand-raked

TABLE 5-17. EXAMPLE ITEMS FOR SURFACE IMPOUNDMENT INSPECTION PLAN

What to inspect	When to inspect	What to look for	How to inspect
Raw materials	At receipt	Shipping damage	Visual
		Off-spec items	Visual/grab samples
	In storage	Deterioration	Visual
		Contamination	Visual
	At installation	Deterioration	Visual
		Contamination	Visual/testing
		Handling damage	Visual
		Proper placement	Visual/check plans
Construction procedures	During construction	Proper equipment	Visual
		Proper execution	Review with installer
			Visual checks
Finished components	At completion	Leases, holes, cracks, etc.	Visual
		Permeability	Perform/review tests
		Seam integrity	Perform/review tests
		Dimensions	Measurements
		Repairs	Visual/testing

all inclusive nor detailed. Your inspection plan should indicate what type of deterioration to look for, where to visually inspect the material, what samples to take, and what tests to perform or review. For example;

- "As the liner material is being unfolded, check for 'blocking' by looking for places where delamination has occurred, check for cracks by looking at places where the material was folded," or
- "After the sand has been spread, and rough graded, but before final compaction or grading walk across it in a 'zig-zag' fashion looking for off-size or foreign materials."

Paragraph(b) of §264.226 identifies four things that must be inspected weekly and after storms; overtopping control systems, liquid level, leak detection system (if present), and dikes and other containment devices. These inspections need to be conducted when the surface impoundment is in operation, or any time that it contains waste. The requirement for inspection after storms is in addition to the weekly inspection requirement.

The need to conduct inspections during a storm of extended duration will depend on the location and design of the surface impoundment. The permit applicant should consider how to address the need for inspections during a storm when preparing the inspection plan. Table 5-18 is a list which illustrates the type of information and level of detail which an adequate inspection plan would generate.

In some cases, a synthetic liner will be protected by a layer of soil from potential damage due to sunlight or wind. This protective soil layer should be included in the inspection plan.

If mechanical equipment is used to remove sludge from the bottom of the impoundment, checks of its operation and condition should be included to insure that the liner is not being damaged. When sludge removal equipment is used in a synthetically lined impoundment, a layer of protective soil is usually installed. This protective soil liner should be included in the inspection plan to insure that its depth over the liner is maintained.

Paragraph (c) of §264.226 requires that the structural integrity of the surface impoundment dike be certified by a qualified engineer. For a surface impoundment operating under interim status, part of the certification process should be a site inspection of the dike. For a new unit, the certification will be based on a review of the final design and specifications. If a surface impoundment is not in service for any extended period (at least 6 months), then certification is required before it can resume operation. In any of these cases, the permit applicant should consider including, as part of the certification, any calculations conducted to establish that the dike complies with §264.226(c)(1) and (2).

TABLE 5-18. EXAMPLE LIST OF ITEMS FOR AN INSPECTION PLAN FOR AN OPERATING SURFACE IMPOUNDMENT

Inspector Name

Weekly/After Storm Inspection

Time of Inspection

Date of Inspection

Liquid Level Indicator/Controller Check

Inlet Flow Valve Check

High Level Alarm Check

By-pass System Check

Liquid Level Check/Record

Leak Detection/Containment System Check

- Evidence of liquid
- Pump operation
- Component integrity

Dike/Containment System Check

- Subsidence/erosion/corrosion
- Leaks
- Dampness

5.5.2.5 Inspections of Waste Piles--

Any owner or operator of a facility that stores or treats hazardous waste in piles must, in addition to the inspection requirements of §264.15, comply with the inspection requirements of §264.254. If the pile qualifies for exemption from the Part 264, Subpart F requirements, then the owner or operator must also comply with the inspection requirements of §264.253(a)(3).

The inspection requirements for all waste piles are;

> "§264.254 Monitoring and inspection.
>
> (a) During construction or installation, liners (except in the case of existing portions of piles exempt from §264.251(a)) and cover systems (e.g., membranes, sheets, or coatings) must be inspected for uniformity, damage, and imperfections (e.g., holes, cracks, thin spots, or foreign materials). Immediately after construction or installation:
>
> (1) Synthetic liners and covers must be inspected to ensure tight seams and joints and the absence of tears, punctures, or blisters; and
>
> (2) Soil-based and admixed liners and covers must be inspected for imperfections including lenses, cracks, channels, root holes, or other structural non-uniformities that may cause an increase in the permeability of the liner or cover.
>
> (b) While a waste pile is in operation, it must be inspected weekly and after storms to detect evidence of any of the following:
>
> (1) Deterioration, malfunctions, or improper operation of run-on and run-off control systems;
>
> (2) The presence of liquids in leak detection systems, where installed to comply with §264.252;
>
> (3) Proper functioning of wind dispersal control systems, where present; and
>
> (4) The presence of leachate in and proper functioning of leachate collection and removal systems, where present."

Additionally, for waste piles which qualify for exemption from the Part 264, Subpart F requirements for ground water protection, the inspection requirements are;

> "§264.253(a)(3) The wastes in the pile must be removed periodically, and the liner must be inspected for deterioration, cracks, or other conditions that may result in leaks. The frequency of inspection will be specified in the inspection plan required in §264.15 and must be based on the potential for the liner (base) to crack or otherwise deteriorate under the conditions of operation (e.g., waste type, rainfall, loading rates, and subsurface stability)."

The provisions of §264.254 require inspections at two distinct times, which are; during and immediately after construction (paragraph(a)), and weekly during operation (paragraph (b)). In addition, §264.253 requires that owners or operators of piles which qualify for exemption from Part 264, Subpart F must periodically remove the wastes from the pile and conduct an inspection of the pile liner.

The intent of paragraph (a) of §264.254 is to insure that both the materials and the construction of a waste pile comply with the plans which have served as a basis for granting a permit. Although the material suppliers and construction contractors will employ quality assurance procedures and tests, you must include provisions in your inspection plan for overseeing and reviewing the contractor or supplier procedures. The personnel you identify to conduct these inspections should represent *only* the owner's or operator's interests. The inspection procedures should include a statement of when, during construction, the inspections will be conducted and should provide for inspector approval before construction is allowed to continue. It may be necessary to identify multiple inspectors to insure that qualified personnel are conducting the inspections during the various construction phases.

Paragraph (a) of §264.254 specifically mentions liners and cover systems. However, any inspection plans submitted to comply with §264.254(a) should provide for inspection of materials and construction of all the various components of the waste pile. The applicant should refer to the discussion of inspection of surface impoundments for guidance on inspection plans for raw materials, construction equipment and procedures, and post-construction inspections.

The portion of the inspection plan developed to comply with §264.254(a) should address the following topics; what will be inspected, when will it be inspected, what will be looked for, how will it be inspected, and what criteria establish failure and require corrective action. See Table 5-17 in the preceding discussion on surface impoundments for examples of items to include in an inspection plan.

Paragraph(b) of §264.254 identifies four things that must be inspected *weekly and after storms*; run-on and run-off control systems, liquids in the leak detection system (if present), wind dispersal control system (if present), leachate collection and removal systems (if present). These inspections only need to be conducted when the waste pile is in operation, or any time that it contains waste. The requirement for inspection after storms is in addition to the weekly inspection requirement.

The need to conduct inspections *during* a storm of extended duration will depend on the location and design of the waste pile. The permit applicant should consider how to address the need for inspections during a storm when preparing the inspection plan. Table 5-19 is a list which illustrates the type of information and level of detail which an adequate inspection plan would generate.

The inspection requirements of §264.253(a)(3) must be compiled with *only* if the waste pile is exempted from the ground water protection requirements of Part 264, Subpart F by meeting the requirements of §264.253(a)(1), (2), (4) and (5). The inspection plan, in these instances, should indicate how the wastes will be removed from the pile, where they will be placed during liner

TABLE 5-19. EXAMPLE LIST OF ITEMS FOR AN INSPECTION PLAN FOR AN OPERATING WASTE PILE

Inspector Name

Weekly/After Storm Inspection

Time of Inspection

Run-on Control System Checks

- Checked for integrity
- Checked for clogging/blockage
- Mechanical parts checked for proper operation

Run-off Control System Checks

- Checked for integrity
- Checked for clogging/blockage
- Run-off collection system capacity confirmed
- Mechanical parts checked for proper operation

Leak Detection/Containment System Checks

- Evidence of liquid
- Pump operation
- Component integrity

Leachate Collection/Removal System Checks

- Flow checks
- Pump operation
- Component integrity

Wind Dispersal Control System Checks

- Damage/integrity
- Effectiveness
- Waste accumulation

---

inspection, how the liner will be inspected, and how the wastes will be placed back onto the pile. The inspection plan must also state the frequency that the inspection procedure will be conducted. You should be prepared to justify the frequency chosen based on your knowledge of waste type, rainfall, loading rates, subsurface stability, or other operating or location conditions.

5.5.2.6 Inspections of Landfills--

Any owner or operator of a facility that disposes of hazardous waste in a landfill must, in addition to the inspection requirements of §264.15, comply with the inspection requirements of §264.303, which are;

> "§264.303 Monitoring and inspection.
>
> (a) During construction or installation, liners (except in the case of existing portions of landfills exempt from §264.301(a)) and cover systems (e.g., membranes, sheets, or coatings) must be inspected for uniformity, damage, and imperfections (e.g., holes, cracks, thin spots, or foreign materials). Immediately after construction or installation:
>
> (1) Synthetic liners and covers must be inspected to ensure tight seams and joints and the absence of tears, punctures, or blisters; and
>
> (2) Soil-based and admixed liners and covers must be inspected for imperfections including lenses, cracks, channels, root holes, or other structural non-uniformities that may cause an increase in the permeability of the liner or cover.
>
> (b) While a landfill is in operation, it must be inspected weekly and after storms to detect evidence of any of the following:
>
> (1) Deterioration, malfunctions, or improper operation of run-on and run-off control systems;
>
> (2) The presence of liquids in leak detection systems, where installed to comply §264.302;
>
> (3) Proper functioning of wind dispersal control systems, where present; and
>
> (4) The presence of leachate in and proper functioning of leachate collection and removal systems, where present."

The provisions of §264.303 require inspections at two distinct times, which are; during and immediately after construction (paragraph(a)), and weekly during operation (paragraph (b)). The intent of paragraph (a) is to insure that both the materials and the construction of a landfill comply with the plans which have served as a basis for granting a permit. Although the material suppliers and construction contractors will employ quality assurance procedures and tests, you must include provisions in your inspection plan for overseeing and reviewing the contractor or supplier procedures. The personnel you identify to conduct these inspections should represent only the owner's or operator's interests. The inspection procedures should include a statement of when, during construction, the inspections will be conducted and should provide for inspector approval before construction is allowed to continue. It may be necessary to identify multiple inspectors to insure that qualified personnel are conducting the inspections during the various construction phases.

Paragraph (a) of §264.303 specifically mentions liners and cover systems. However, any inspection plans submitted to comply with §264.303(a) should provide for inspection of materials and construction of all the various components of the landfill. The applicant should refer to the discussion of inspection of surface impoundments for guidance on inspection plans for raw materials, construction equipment and procedures, and post-construction inspections.

The portion of the inspection plan developed to comply with §264.226(a) should address the following topics; what will be inspected, when will it be inspected, what will be looked for, how will it be inspected, and what criteria establish failure and require corrective action. See Table 4 in the preceding discussion of surface impoundments for a list of example inspection items.

Paragraph (b) of 264.303 identifies four things that must be inspected weekly and after storms; run-on and run-off control systems, leak detection systems (if present), wind dispersal control systems (if present), and leachate collection and removal systems (if present). These inspections only need to be conducted when the landfill is in operation, or any time that it contains waste. The requirement for inspection after storms is in addition to the weekly inspection requirement.

The need to conduct inspections during a storm of extended duration will depend on the location and design of the landfill. The permit applicant should consider how to address the need for inspections during a storm when preparing the inspection plan. See Table 6 in the preceding discussion of waste piles for illustration of the type and detail of information that an adequate inspection plan would generate.

5.5.2.6 Inspections of Land Treatment Facilities--

Any owner or operator of a facility that treats or disposes of hazardous wastes in land treatment units must, in addition to the inspection requirements of §264.15, comply with the inspection requirements of §264.273(g), which are;

> "§264.273(g)
>
> The owner or operator must inspect the unit weekly and after storms to detect evidence of:
>
> (1) Deterioration, malfunctions, or improper operation of run-on and run-off control systems; and
>
> (2) Improper functioning of wind dispersal control measures."

The requirements of §264.273(g) are straightforward in requiring weekly and after storm inspection of run-on, run-off, and wind dispersal control systems. Run-on and run-off controls which consist of diversion dikes/berms and open channels or trenches are key to preventing the uncontrolled spread of waste outside the actual land treatment facility.

Inspection items relative to run-on controls include confirmation that channels and trenches are free of debris or other blockage and that their capacity remains as originally designed. Inspection of run-on diversion dikes and berms should include checks for erosion. The erosion that should be checked for is that which results from water scouring at the sides of the dikes and berms and erosion that would reduce the structure's effective height or length.

Inspection items relative to run-off control system channels, trenches, dikes, and berms are identical to those for run-on control systems. However, run-off control systems are likely to include some type of collection area for the run-off. The inspection plan should include procedures for inspecting the equipment associated with these collection areas. If run-on is collected in tanks or surface impoundments, the inspection plan should provide procedures identical to those discussed for these types of facilities in the preceding pages.

Wind dispersal control measures could be chemical, botanical, or physical treatment of the land treatment facility surface, or natural or manmade wind-breaks. Where the land treatment facility surface itself is treated or covered in some manner to reduce wind dispersal, the inspection plan should identify procedures to check these measures. For example, if some type of surfactant is applied, inspection should include checks of application rate and coverage; if vegetation is planted the inspection should include checks of its condition and coverage; and if some type of physical cover is used the inspection should include checks of anchor points and cover integrity.

Wind breaks can be rows of trees, shrubs, or fences around the land treatment facility. The inspection plan should povide for visual inspection of these items for gaps or breakage. It is also important to check around these items for accumulated materials originating from the land treatment unit.

5.5.3 List of Major Points

1. Are all equipment, devices, and structures that will be inspected identified?

2. Are specific parts of the equipment, devices, and structures identified in detail for inspection?

3. Is the frequency of inspection for each item clearly indicated?

4. Are the facility-type specific terms and frequencies included in the inspection schedule?

5.5.4 References

1. Hesketh, H. E., Handbook for the Operation and Maintenance of Air Pollution Control Equipment, Technomic, Westport, Connecticut, 1975.

2. Cheremisinoff, N. P., Process Level Instrumentation and Control, Marcel Dekker, Inc., New York, 1981.

5.6 PREPAREDNESS AND PREVENTION

5.6.1 Regulatory Citations

Information on preparedness and prevention must be included in Part B of the permit application, as specified in:

> "§270.14(b)(6) A justification of any request for waiver(s) of the preparedness and prevention requirements of Part 264, Subpart C."

The regulatory requirements regarding preparedness and prevention are contained in Subpart C of Part 264. They are:

> "Part 264 - Subpart C - Preparedness and Prevention
>
> §264.30 Applicability.
> The regulations in this Subpart apply to owners and operators of all hazardous waste facilities, except as §264.4 provides otherwise.
>
> §264.31 Design and operation of facility.
> Facilities must be designed, constructed, maintained, and operated to minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water which could threaten human health or the environment.
>
> "§264.32 Required equipment.
> All facilities must be equipped with the following, unless it can be demonstrated to the Regional Administrator that none of the hazards posed by waste handled at the facility could require a particular kind of equipment specified below:
> (a) An internal communications or alarm system capable of providing immediate emergency instruction (voice or signal) to facility personnel;
> (b) A device, such as a telephone (immediately available at the scene of operations) or a hand-held two-way radio, capable of summoning emergency assistance from local police departments, fire departments, or State or local emergency response teams;
> (c) Portable fire extinguishers, fire control equipment (including special extinguishing equipment, such as that using foam, inert gas, or dry chemicals), spill control equipment, and decontamination equipment; and
> (d) Water at adequate volume and pressure to supply water hose streams, or foam producing equipment, or automatic sprinklers, or water spray systems.
>
> §264.33 Testing and maintenance of equipment.
> All facility communications or alarm systems, fire protection equipment, spill control equipment, and decontamination equipment,

where required, must be tested and maintained as necessary to assure its proper operation in time of emergency.

§264.34 Access to communications or alarm system.

(a) Whenever hazardous waste is being poured, mixed, spread, or otherwise handled, all personnel involved in the operation must have immediate access to an internal alarm or emergency communication device, either directly or through visual or voice contact with another employee, *unless* the Regional Administrator has ruled that such a device is not required under §264.32.

(b) If there is ever just one employee on the premises while the facility is operating, he must have immediate access to a device, such as a telephone (immediately available at the scene of operation) or a hand-held two-way radio, capable of summoning external emergency assistance, *unless* the Regional Administrator has ruled that such a device is not required under §264.32.

§264.35 Required aisle space.

The owner or operator must maintain aisle space to allow the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to any area of facility operation in an emergency, *unless* it can be demonstrated to the Regional Administrator that aisle space is not needed for any of these purposes.

§264.36 Special handling for ignitable or reactive waste.*

§264.37 Arrangements with local authorities.

(a) The owner or operator must attempt to make the following arrangements, as appropriate for the type of waste handled at his facility and the potential need for the services of these organizations:

(1) Arrangements to familiarize police, fire departments, and emergency response teams with the layout of the facility, properties of hazardous waste handled at the facility and associated hazards, places where facility personnel would normally be working, entrances to and roads inside the facility, and possible evacuation routes;

(2) Where more than one police and fire department might respond to an emergency, agreements designating primary emergency authority to a specific police and a specific fire department and agreements with any others to provide support to the primary emergency authority;

(3) Agreements with State emergency response teams, emergency response contractors, and equipment suppliers; and

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*This section was revoked and reserved by a Federal Register notice on January 12, 1981 at 46 FR 2847. Applicants should call the RCRA Hotline (see Appendix A) to see if these requirements have been added.

(4) Arrangements to familiarize local hospitals with the properties of hazardous waste handled at the facility and the types of injuries or illnesses which could result from fires, explosions, or releases at the facility.

(b) Where State or local authorities decline to enter into such arrangements, the owner or operator must document the refusal in the operating record."

Requests and justifications for waivers of any of the Part 264 - Subpart C requirements must be made in Part B of the permit application. The inherent hazards associated with the treatment, storage, and disposal of hazardous waste reduce the possible scenarios where valid justification for waivers could be demonstrated. Thus, the guidance provided will be for owners or operators of hazardous waste facilities attempting to achieve compliance with the Part 264 standards.

5.6.2 Guidance to Achieve the Part 264 Standards

5.6.2.1 General--

The intent of Subpart C of Part 264 is to insure that each permit applicant provides a complete description of the preparedness and prevention measures which have been or will be implemented at the HWM facility to minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water which could threaten human health or the environment.

Subpart C sets requirements on:

- Facility design and operation in §264.31,
- Equipment available in §264.32,
- Equipment testing and maintenance in §264.33,
- Communications or alarm systems in §264.34,
- Aisle space in §264.35, and
- Arrangements with local authorities in §264.37.

Much of the information necessary to demonstrate compliance with the requirements of Subpart C will be developed and contained in detail in other portions of Part B of the permit application. In these cases, a brief description should be incorporated in the discussion of Preparedness and Prevention and the location of the specific details should be referenced.

Additionally, the Subpart C requirements are closely tied to the Contingency Plan required by Subpart D of Part 264. The Contingency Plan is described in the next section of this manual. Whereas Subpart C requires a description and documentation that efforts have been taken to prevent and be prepared for an emergency or unplanned occurrence, the Contingency Plan required in Subpart D is a document that facility personnel will use if an unplanned or emergency event occurs.

5.6.2.2 Preparedness and Prevention [40 CFR 270.14(b)(6) and §264.30-264.37]--

Applicability [§264.30]. All owners and operators of hazardous waste facilities must comply with the requirements of Subpart C unless the applicant is exempt as specified in §264.1.

Design and Operation of Facility [§264.31]. The applicant must insure that his HWM facility has been designed, constructed, maintained, and operated to minimize the hazards associated with the hazardous waste operations employed at the facility. Drawings sketches, or plans of the facility and construction specifications should be included to demonstrate that the design and construction of the facility comply with the Part 264 standards. Facility operation manuals or procedures should be included to describe the methods used to maintain and operate the facility.

In this case, much of the information required to demonstrate "preparedness and prevention" will be incorporated elsewhere in Part B of the application for other reasons. Thus, in order to demonstrate compliance, the discussion in this part of the application could emphasize how the design, construction, maintenance, and operation of the facility "minimize" danger and contribute to preparedness and prevention. The discussion should direct the permit reviewer to those other locations in the application where the detailed plans and procedures are presented.

Required Equipment [§264.32]. The regulation specifically identifies four (4) categories of emergency equipment which must be identified and discussed in the permit application. You should also be aware that the requirements of §264.54(e) also address emergency equipment and require that specific details of that equipment be included in the Contingency Plan. The equipment categories identified in §264.32 are items whose inclusion in the facility design demonstrate that you are "prepared" for an emergency or unplanned occurrence. Thus, a somewhat general discussion here, which identifies the type, number, and location of the communication and alarm systems, would be acceptable if the detailed descriptions in the Contingency Plan are properly referenced.

Internal Communication or Alarm System [§264.32(a)]. The facility must have a communication or alarm system capable of providing emergency instruction. The primary purpose of the alarm system is to provide emergency instruction to enable rapid evacuation of the affected areas. A secondary, but equally important purpose is to initiate the emergency response plan which is part of the Contingency Plan. Intercoms, internal telephones or two-way radios can serve as communication devices. The alarm system should be a bell, siren, buzzer or similar device audible from all areas of the facility. The alarms can be either manually or automatically activated, but automatic systems should also provide for manual activation. Switches should be readily accessible to all personnel involved in waste handling operations.

Example:

"The operations building is equipped with 15 wall-mounted switches tied into an electric bell alarm system. Ten switches are located in production areas, adjacent to each of 10 work stations, and five are located in storage areas. The switches are clearly marked for rapid identification. Workmen are instructed to keep the surrounding areas free of obstructions. In addition, remote sensors which detect combustible gas, low oxygen levels and sprinkler system flow are tied into the alarm. Activation of any individual switch or remote sensor will sound all bell alarms and lights in the system.

Two work crews, consisting of four men each, are involved in outside landfilling and treatment operations. Each crew foreman carries a hand-held two-way radio which can be used to contact the operations room in the event of an emergency. Members of the crews maintain visual and voice contact with each other at all times.

There is an internal phone system which connects the operations room to all areas of the operations building. There is a phone (part of this system) located at the landfill and at the treatment area.

A complete description of the alarm system showing switch, sensor, and alarm bell locations and system specifications can be found on page _ of the Contingency Plan (Attachment _ of this application). An equally detailed description of the phone system begins on page _ of the Contingency Plan."

External Communication System [264.32(b)]. Should an emergency situation arise, the HWM facility will need some means of summoning assistance from local police departments, fire departments, and State and local emergency response teams. Both a telephone and a hand-held two-way radio are acceptable communication devices. Such devices must be immediately available at the scene of operations.

Example:

"The facility is equipped with an intercom system to provide internal emergency communications. Any emergency will be brought to the attention of the chief engineer stationed at the operations control room. He will quickly evaluates the situation and places any necessary calls to police departments, fire departments and/or emergency response teams from one of the outside phones located in the control room. If the control room is affected by the emergency situation, a telephone at the front gate will be used to summon assistance.

Details on the specifications, locations, and operation of the intercom system are located on page _ of the Contingency Plan. The locations of all outside phones are shown on the emergency equipment location plan which follows page _ in the Contingency Plan."

Emergency Equipment [§264.32(c)]. Provide a description of any equipment to be used in the event of an emergency situation. Emergency equipment must include portable fire extinguishers, fire control equipment (including any special extinquishing equipment such as foams, inert gas, or dry chemicals), spill control equipment (e.g. pumps, absorbants, vacuum cleaners, etc.) and decontamination equipment (e.g. pumping or vacuum equipment). You should provide a description of the number and type of each piece of emergency equipment and its location and function relative to process operations.

Example for Fire Control Equipment: (Considering a facility which employs several physical/chemical processes for treating liquid hazardous wastes.)

"Several treatment processes are carried out in a large single floor building. To provide rapid response to fires, wall-mounted, hand-held fire extinguishers are centrally located at each of six operations. Three additional extinguishers are provided in a storage area. Because the primary danger of fire is from flammable liquids, carbon dioxide extinguishers are used. An automatic sprinkler system runs throughout the building. The sprinkler system is of the foam-water type; providing an initial discharge of water. The sprinkler heads are designed to open at between 250 and 286°F and are spaced 10 feet apart, each head covering an area of 100 square feet.

The outside yard storage area contains four fire hydrants, spaced 100 feet apart and 125 feet of 2 1/2 inch fire hose are stored on racks next to each hydrant."

Example for Spill Control:

"The facility has several above ground tanks used to store and/or treat hazardous wastes. To control spills, each tank is completely surrounded by a dike constructed of compacted clay soil. The dikes are of sufficient height to contain the entire contents of the tanks. The facility has three identical trailor-mounted portable pumps powered by 10-HP gasoline engines. Each pump can transfer __ GPM at 20 ft. TDH. The facility maintains sufficient empty tank capacity to transfer the contents of the largest tank onsite."

Example for Decontamination Equipment:

"The facility owns a 10,000 gallon tank truck which has been fitted with a vacuum unit that is capable of cleaning up solid or liquid materials. The tank truck also has fittings compatible with the hoses used on the trailer-mounted emergency pumps. A separate vacuum unit, mounted on a special fork-lift compatible skid, is stored in the same shed as the emergency fire equipment. By agreement, an additional 10,000 gallon tank truck is available from the County Fire Department."

Water Supply for Fire Fighting Equipment [264.32(d)]. The owner or operator must show that sufficient water will be available for emergency use. In addition to providing water for sprinklers, the supply should be adequate for hydrants and hose streams. Identify any secondary water supplies such as gravity tanks, suction tanks, private reservoirs, rivers, ponds, etc., which can be used in case of emergency.

Example:

> "A public water supply serves as the primary source of emergency water. The system has a rated delivery capacity of 1,500 gpm at 40 psig. This supply is supplemented by two 100,000 gallon gravity water tanks capable of delivering 1,500 gpm at 60 psig. The maximum water requirement under worst case conditions is estimated to be 2,000 gpm."

You are reminded that the required equipment identified in §264.32 must be described in more detail in the Contingency Plan which is presented in the next section of this manual. The intent of the regulations is to insure that you have given serious thought to the unplanned or emergency situations that might occur at your facility and have made plans to handle these situations in ways which minimize threats to human health and the environment.

Testing and Maintenance of Equipment [§264.33]. Your facility's communication and/or alarm systems, fire protection equipment, spill control equipment, and decontamination equipment must be periodically inspected and tested to insure proper operation during an emergency. The inspection procedure must conform to guidelines provided in Section 264.15. The applicant should prepare an inspection schedule detailing testing and maintenance procedures. The frequency of scheduled testing and maintenance will vary depending on the role and reliability of the individual pieces of equipment. Most emergency equipment requires a relatively frequent and thorough inspection to insure that it will adequately perform its contingency function so as to prevent dangerous conditions. See Section __, Inspections, for a detailed discussion of inspection testing and maintenance requirements.

The intent of §264.33 is to insure that you have included all your emergency equipment in the Inspection Plan and Schedule that you are required, by §264.15, to prepare and submit with Part B of the permit application. Satisfactory compliance with §264.33 can be achieved by thoroughly referencing where the emergency equipment inspection and maintenance procedures can be found in the Inspection Plan and Schedule.

Example:

> "All the equipment required by §264.32 will be inspected, tested, and maintained as required by §264.33. A complete list of the emergency equipment can be found beginning on page _ of the Contingency Plan (Attachment to this application). Inspections, tests, and maintenance are contained in the Inspection Plan and Schedule that is Attachment _ to this application. The following table identifies the equipment and the pages in the Inspection Plan where testing and maintenance are described.

Equipment	Location in Inspection Plan
Internal Communications	pp. 14 and 42
Alarm Systems	pp. 24 through 28
Fire Control Equipment	pp. 15 through 23
Spill Control Equipment	pp. 29 through 35
Decontamination Equipment	pp. 35 through 41
Emergency Water Supply System	pp. 12 and 13

Access to Communications or Alarm System [§264.34(a)]. The applicant must demonstrate that immediate access to a communications or alarm system is available to all personnel involved in hazardous waste handling operations. Access can either be direct or through visual or voice contact with another employee.

Example:

"Fifteen wall-mounted switches, wired into an alarm system, are located throughout building A which houses several hazardous waste processing operations. The switches are centrally located to the various work stations providing immediate access to all employees inside the building. Personnel involved in outside treatment and landfill operations work in two crews of four workmen. The foreman of each crew carries a hand-held two-way radio which can be used to contact the control room should an emergency arise."

Access to Emergency Services [§264.34(b)]. If there is ever a situation where only one employee is on the premises while the facility is in operation, that person must have immediate access to an outside communications device such as a telephone or a hand-held two-way radio with which emergency help can be summoned. When the facility is not operating, but attended by a single individual, you should still consider the issue of access to outside communications.

Required Aisle Space [§264.35]. The applicant must show that sufficient aisle space will be maintained to provide unobstructed movement of emergency equipment. In providing information on aisle space, it would be helpful to include floor plans indicating the spacial distribution of aisles relative to process operations and building entries.

Example:

"Aisles within the operations building provide access to storage areas and each process operation. The aisle width is maintained at _ inches to allow passage of two fork trucks. Aisle boundaries are clearly marked with four inch wide orange lines. Workmen are instructed to keep aisles clear of obstructions at all times."

Arrangements with Local Authorities [§264.37(a)]. The permit applicant is required to attempt to make arrangements with appropriate local agencies in an effort to coordinate responses to emergency situations. Any arrangements that are made must be described in detail in the Contingency Plan. If you are applying for a permit for either an existing or new facility you must make these arrangements and submit them in your Contingency Plan with your permit application. As part of the "arrangements to familiarize" that are required by §264.37(a)(1), you should consider touring the local authorities through your facility. This, of course, may not be possible for you to do prior to submitting a permit application for a new facility. However, an application for a new facility must, at a minimum, indicate that agreements have been reached and that you have supplied the authorities with some information. It may also be to your advantage to indicate in your permit application that you will supplement that information and provide the opportunity for onsite visits after the facility is constructed.

Arrangements with Emergency Services [§264.37(a)(1)]. Provide police, fire and emergency response teams with a layout of the facility. Identify types of hazardous wastes handled, places where workers are normally working, facility entrances, roads inside the facility and possible evacuation routes. Detailed site maps and floor plans showing water supplies, process operations, access routes, etc. would be helpful. Indicate any special hazardous situations which might be encountered (e.g. explosions, toxic fumes, reactive chemicals) and discuss any special equipment needed to protect personnel (e.g. protective clothing, respirators). It would also be a good idea to have fire department officials visit the plant to inspect fire protection capabilities onsite. If a fire department inspection is required as part of your local building permit, you should mention that fact in your application.

Example:

> "Meetings were held between management, personnel and local fire, police and emergency response officials. Detailed site maps and building floor plans were provided for each agency. They have been given lists of wastes being treated, and information detailing hazardous characteristics of the wastes involved. Fire department officials have visited the site and have observed site access routes, the locations of highrisk areas, and have inspected fire protection capabilities including sprinkler systems and primary and secondary water supplies. In addition, the fire department has conducted training exercises using an ignitable oily sludge waste. The fire department has also provided training for an emergency squad comprised of five plant personnel. Their role will be to begin emergency operations immediately, preparing for the arrival of the local fire department and to guide the fire fighting effort because of their intimate knowledge of plant operations. They are also responsible for rescue operations and evacuation of injured or threatened personnel."

Agreements Designating Primary Emergency Authority [§267.37(a)(1)]. Local police and fire departments often have reciprocating emergency response agreements with departments within the same region. Where such agreements exist, the site owner or operator must attempt to designate specific fire and police departments as primary emergency authorities. Site owners or operators must attempt to obtain agreements with other departments to provide support to the primary emergency authority. Such agreements should be obtained in writing and photocopies should be included in the Contingency Plan submitted with the permit application.

Example:

> "Five towns around the facility have fire departments operating under cooperative assistance agreements. The are: Grey, Acton, Athol, Paris, and Middleton. Only the Grey and Paris departments have agreed to assist our fire department (Middleton) in an emergency response to our facility. We have met with the Chiefs of those three departments and it has been agreed that the Middleton Chief will be responsible for calling out the Paris and Grey departments, in that order, as needed. The Middleton Chief has been designated the primary fire equipment authority. He will be with the Emergency Coordinator in the Emergency Response Center and will direct his equipment, through his Lieutenant, and the other equipment, through their respective Chiefs onsite, from that point."

Agreements with Emergency Response Teams [§264.37(a)(3)]. The owner or operator should attempt to make arrangements to the appropriate state emergency response team, emergency response contractor and/or equipment suppliers. These arrangements must also be included in the Contingency Plan but should be described in the same detail as the above example in the application.

Arrangements with Local Hospitals [§264.37(a)(4)]. The owner or operator should furnish local hospital officials with information on the properties and types of hazardous waste handled at the facility In addition, the types of injuries or illnesses that could result from fires, explosions or releases of those hazardous materials should be thoroughly presented to the hospital. With this information, the hospital can develop a procedure for addressing any special type of injuries which may occur during an emergency. Include a detailed discussion of hospital arrangements in the Contingency Plan.

Example:

> "Pesticide residues stored at the facility would produce harmful emissions in the event of a fire. The hospital has been informed that inhalation of these emissions could result in poisoning symptoms. The hospital has a contingency plan calling for decontamination and treatment of potential victims. The decontamination procedure consists of removing the victims clothing and sealing it in plastic bags. The individuals are then bathed and issued clean hospital gowns. Blood tests and chest x-rays are then administered to detect any signs of poisoning."

Failure to Reach Agreements [§264.37]. If state or local authorities decline to enter into arrangements, the owner or operator must document the refusal in the operating record. You should identify all agencies with which agreements could not be reached and identify their reasons for declining to enter into agreements.

5.6.3 List of Major Points

1. Have the facets of facility design, construction, maintenance, and operation which contribute to preparedness and prevention been highlighted and discussed? Have the places in the permit application where details can be found been adequately referenced?

2. Have each of the four required equipment groups been discussed and references made to the locations of more detailed information in the Contingency Plan?

3. Has a statement been made regarding emergency equipment testing and maintenance? Has the Inspection Plan and Schedule been referenced?

4. Has it been shown that all employees have immediate access to communications and alarms? Has access to emergency services during single employee occupancy been addressed?

5. Is there a discussion of aisle space adequacy, documented by plot plans or other drawings?

6. Have attempts at arrangements with local authorities been documented? Are successful agreements described and their location in the Contingency Plan referenced? Have failed agreement attempts been noted? Have fire, police, emergency response, and hospitals all been addressed?

5.7 CONTINGENCY PLAN AND EMERGENCY PROCEDURES

5.7.1 Regulatory Citations

Information on the Contingency Plan and Emergency Procedures must be included in Part B of the permit application, as specified in:

> "§270.14(b)(7) A copy of the contingency plan required by Part 264, Subpart D. Note: Include where applicable, as part of the contingency plan, specific requirements in §264.227 and 264.255."

The regulatory requirements regarding the Contingency Plan are contained in Subpart D of Part 264. They are:

> "Subpart D--Contingency Plan and Emergency Procedures
>
> §264.50 Applicability.
> The regulations in this Subpart apply to owners and operators of all hazardous waste facilities, except as §264.1 provides otherwise.
>
> §264.51 Purpose and implementation of contingency plan.
> (a) Each owner or operator must have a contingency plan for his facility. The contingency plan must be designed to minimize hazards to human health or the environment from fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water.
> (b) The provisions of the plan must be carried out immediately whenever there is a fire, explosion, or release of hazardous waste or hazardous waste constituents which could threaten human health or the environment.
>
> §264.52 Content of contingency plan.
> (a) The contingency plan must describe the actions facility personnel must take to comply with §264.51 and 264.56 in response to fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste constituents to air, soil, or surface water at the facility.
> (b) If the owner or operator has already prepared a Spill Prevention, Control, and Countermeasures (SPCC) Plan in accordance with Part 112 of this Chapter, or Part 1510 of Chapter V, or some other emergency or contingency plan, he need only amend that plan to incorporate hazardous waste management provisions that are sufficient to comply with the requirements of this Part.
> (c) The plan must describe arrangements agreed to by local police departments, fire departments, hospitals, contractors, and State and local emergency response teams to coordinate emergency services, pursuant to §264.37.
> (d) The plan must list names, addresses, and phone numbers (office and home) of all persons qualified to act as emergency coordinator (see §264.55), and this list must be kept up to date. Where more than one person is listed, one must be named as primary

emergency coordinator and others must be listed in the order in which they will assume responsibility as alternates. For new facilities, this information must be supplied to the Regional Administrator at the time of certification, rather than at the time of permit application.

(e) The plan must include a list of all emergency equipment at the facility (such as fire extinguishing systems, spill control equipment, communications and alarm systems (internal and external), and decontamination equipment), where this equipment is required. This list must be kept up to date. In addition, the plan must include the location and a physical description of each item on the list, and a brief outline of its capabilities.

(f) The plan must include an evacuation plan for facility personnel where there is a possibility that evacuation could be necessary. This plan must describe signal(s) to be used to begin evacuation, evacuation routes, and alternate evacuation routes (in cases where the primary routes could be blocked by releases of hazardous waste or fires).

§264.53 Copies of contingency plan.

A copy of the contingency plan and all revisions to the plan must be:

(a) Maintained at the facility; and

(b) Submitted to all local police departments, fire departments, hospitals, and State and local emergency response teams that may be called upon to provide emergency services.

§264.54 Amendment of contingency plan.

The contingency plan must be reviewed, and immediately amended, if necessary, whenever;

(a) The facility permit is revised;

(b) The plan fails in an emergency;

(c) The facility changes—in its design, construction, operation, maintenance, or other circumstances—in a way that materially increases the potential for fires, explosions, or releases of hazardous waste or hazardous waste constituents, or changes the response necessary in an emergency;

(d) The list of emergency coordinators changes; or

(e) The list of emergency equipment changes.

§264.55 Emergency coordinator.

At all times, there must be at least once employee either on the facility premises or on call (i.e., available to respond to an emergency by reaching the facility within a short period of time) with the responsibility for coordinating all emergency response measures. This emergency coordinator must be thoroughly familiar with all aspects of the facility's contingency plan, all operations and activities at the facility, the location and characteristics of waste handled, the location of all records within the facility, and the facility layout. In addition, this person must have the authority to commit the resources needed to carry out the contingency plan.

§264.56 Emergency procedures.

(a) Whenever there is an imminent or actual emergency situation, the emergency coordinator (or his designee when the emergency coordinator is on call) must immediately:

(1) Activate internal facility alarms or communication systems, where applicable, to notify all facility personnel; and

(2) Notify appropriate State or local agencies with designated response roles if their help is needed.

(b) Whenever there is a release, fire, or explosion, the emergency coordinator must immediately identify the character, exact source, amount, and areal extent of any released materials. He may do this by observation or review of facility records or manifests, and, if necessary, by chemical analysis.

(c) Concurrently, the emergency coordinator must assess possible hazards to human health or the environment that may result from the release, fire, or explosion. This assessment must consider both direct and indirect effects of the release, fire, or explosion (e.g., the effects of any toxic, irritating, or asphyxiating gases that are generated, or the effects of any hazardous surface water run-off from water or chemical agents used to control fire and heat-induced explosions).

(d) If the emergency coordinator determines that the facility has had a release, fire, or explosion which could threaten human health, or the environment, outside the facility, he must report his findings as follows:

(1) If his assessment indicates that evacuation of local areas may be advisable, he must immediately notify appropriate local authorities. He must be available to help appropriate officials decide whether local areas should be evacuated; and

(2) He must immediately notify either the government official designated as the on-scene coordinator for that geographical area, (in the applicable regional contingency plan under Part 1510 of this Title) or the National Response Center (using their 24-hour toll free number 800/424-8802). The report must include:

(i) Name and telephone number of reporter;

(ii) Name and address of facility;

(iii) Time and type of incident (e.g., release, fire);

(iv) Name and quantity of material(s) involved, to the extent known;

(v) The extent of injuries, if any; and

(vi) The possible hazards to human health; or the environment, outside the facility.

(e) During an emergency, the emergency coordinator must take all reasonable measures necessary to ensure that fires, explosions, and releases do not occur, recur, or spread to other hazardous waste at the facility. These measures must include, where applicable, stopping processes and operations, collecting and containing released waste, and removing or isolating containers.

(f) If the facility stops operations in response to a fire, explosion, or release, the emergency coordinator must monitor for leaks, pressure buildup, gas generation, or ruptures in valves, pipes, or other equipment, whenever this is appropriate.

(g) Immediately after an emergency, the emergency coordinator must provide for treating, storing, or disposing of recovered waste, contaminated soil or surface water, or any other material that results from a release, fire, or explosion at the facility.

(h) The emergency coordinator must ensure that, in the affected area(s) of the facility;

(1) No waste that may be incompatible with the released material is treated, stored, or disposed of until cleanup procedures are completed; and

(2) All emergency equipment listed in the contingency plan is cleaned and fit for its intended use before operations are resumed.

(i) The owner or operator must notify the Regional Administrator, and appropriate State and local authorities, that the facility is in compliance with paragraph (h) of this Section before operations are resumed in the affected area(s) of the facility.

(j) The owner or operator must note in the operating record the time, date, and details of any incident that requires implementing the contingency plan. Within 15 days after the incident, he must submit a written report on the incident to the Regional Administrator. The report must include:

(1) Name, address, and telephone number of the owner or operator;

(2) Name, address, and telephone number of the facility;

(3) Date, time and type of incident (e.g., fire, explosion);

(4) Name and quantity of material(s) involved;

(5) The extent of injuries, if any;

(6) An assessment of actual or potential hazards to human health or the environment, where this is applicable; and

(7) Estimated quantity and disposition of recovered material that resulted from the incident."

5.7.2 Guidance to Achieve the Part 264 Standards

5.7.2.1 General--

The intent of Subpart D of Part 264 is to insure that all permit applicants have developed and formalized a Contingency Plan for their facilities that will be immediately implemented in the event of a fire, explosion, or other unplanned occurrence that has or could present a hazard to human health or release hazardous waste to the environment.

Subpart D sets requirements on:

- The purpose and implementation of the contingency plan in §264.51,
- Content of the contingency plan in §264.52,
- Copies of the contingency plan in §264.53,
- Amendments of the contingency plan in §264.54,
- Emergency coordinator in §264.55, and
- Emergency procedures in §264.56.

The most effective method for an applicant to demonstrate compliance with the requirements of Subpart D is to develop a formal Contingency Plan and submit that plan as part of Part B of the permit application. The Contingency Plan should be a document written for use by facility personnel in the event of the occurrence of an emergency or unplanned event. In addition to submitting your actual Contingency Plan document, your permit application should include a discussion which identifies where, in the Contingency Plan, the requirements of Subpart D are addressed. This discussion will allow agency personnel who review your application to quickly confirm that your Contingency Plan is adequate.

There are no provisions for a waiver or exemption from the requirement for a Contingency Plan. All owners and operators must develop a Contingency Plan and submit it with Part B of their permit applications. However, the preparedness and prevention requirements set forth in Subpart C of Part 264 are closely tied to the Contingency Plan requirements. Subpart C requirements were discussed in the preceding section of this manual. Thus, although a specific facility may be exempted from certain preparedness and prevention requirements in Subpart C, all facilities must have a Contingency Plan that addresses applicable requirements of Subpart C and all requirements of Subpart D of Part 264. After review and modification or approval, your Contingency Plan will become a condition of your permit.

Owners and operators of surface impoundments must also provide, in their Contingency Plan, procedures that address how compliance with the requirements of §264.227(b) will be achieved. At this time (May 1983), there are no other facility-type specific Contingency Plan requirements. However, the EPA may well add these requirements to Subparts I through O of Part 264 in the future. Owners and operators of facilities should contact the government agency to which they will submit their permit application to determine if there are any facility specific Contingency Plan requirements in effect at the time they are preparing Part B of their application.

5.7.2.2 Contingency Plan and Emergency Procedures [40 CFR 270.14(b)(7) and §264.50-264.56]—

Applicability [§264.50]. All permit applicants must provide a copy of their Contingency Plan unless they have been exempted as specified in §264.1

Purpose and Implementation of Contingency Plan [§264.51]. The contingency plan for your facility must be designed to minimize hazards to human health or the environment from fires, explosions, or any unplanned sudden or nonsudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water. Your Contingency Plan must demonstrate that specified emergency procedures will be implemented immediately whenever a hazard at the facility occurs.

Content of Contingency Plan [§264.52]. Your contingency plan must describe the actions that facility personnel will take to comply with and implement the plan (§264.51) including emergency procedures (§264.56). If you have already prepared a Spill Prevention, Control, and Countermeasures (SPCC)

Plan or other emergency or Contingency Plan for your facility, amendments to that plan may fulfill the requirements of Subpart D. If so, the amended plan should be submitted with Part B of your permit application. A sample table of contents for a Contingency Plan is shown in Table 5-20.

The following four components are specifically identified in §264.52, paragraphs (c) through (f), as necessary for inclusion in an adequate Contingency Plan.

Coordinated Emergency Services (§264.52(c))--A coordinated emergency services plan must be arranged and agreed to by local police departments, fire departments, hospitals, contractors, State and local emergency response teams, and the HWM facility's owner or operator, pursuant to §264.37. You should obtain written agreements whenever possible. See the discussion in the preceding section of this manual on Subpart C--Preparedness and Prevention (§264.37) for additional information on coordinated emergency services.

Copies of written agreements must be included in the Contingency Plan document. Remember, the Contingency Plan is written for use by your personnel. Therefore, in addition to copies of the written agreements, detailed instructions should be included in the Contingency Plan of how coordinated emergency services are obtained, what will be provided, and how they will be managed. The part of your permit application where you are describing these arrangements to the regulatory agency can be general and brief provided that you reference the specific part of the Contingency Plan where details are provided.

In Table 5-20, the example table of contents indicates that Part 5 of the Contingency Plan contains information on Coordinated Emergency Services. In the part of your permit application where you are describing these services to the regulatory agency, you could make a statement similar to;

> "Coordinated Emergency services agreements have been established in writing with: the fire departments of Middleton, Grey, and Paris; the Middleton Police and the State Police; the Bellevue Hospital in Middleton and the Acton State Hospital in Acton; and HazCon Services, Inc. in Athol. No written agreement has been established with the State emergency response team. That team has indicated that they are required by State Law to cooperate in the event of an emergency. All the above identified groups have toured our facility, participated in development of the Coordinated Emergency Services section of our Contingency Plan, and have been supplied with copies of that Plan. The Coordinated Emergency Services section begins on page __ of the Contingency Plan (attachment __ to this application) and contains copies of the written agreements as well as complete procedures for activating and coordinating the indicated emergency services."

TABLE 5-20. SAMPLE TABLE OF CONTENTS FOR A CONTINGENCY PLAN

---

1. Purpose
2. Scope
3. Responsibilities
4. Organization and Duties
5. Coordinated Emergency Services
6. Training
7. Routine Surveillance to Detect Potential Hazards
8. Emergency Procedures
    - A. Fire
    - B. Explosion
    - C. Hazardous Waste Release
9. Evacuation Plans
10. Recordkeeping and Incident Reports

Appendix A--List of Emergency Coordinators, names, addresses and phone numbers

Appendix B--List of Emergency Equipment

Appendix B--Incident Reports

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In your Contingency Plan, the Coordinated Emergency Services section should be written to instruct facility personnel on "how to" obtain and coordinate those services. An example of how that section of your plan might be presented is given below:

"This section of the Contingency Plan identifies available off-plant Emergency Services. Written agreements with these off-plant groups are at the end of this section. These services are to be requested only by the In-Plant Emergency Coordinator.

- Call the Middleton Fire Department, Telephone No. 774-9191
- Notify the Plant Fire Coordinator to meet fire equipment at the West Gate with mobile radio.
- Plant Fire Coordinator will send ranking responding officer to Emergency Control Center.
- Plant Fire Coordinator will stay with fire equipment.
- The ranking responding fire department officer will direct equipment from Control Center until replaced by the Middleton Fire Chief on his arrival.
- All Plant Fire Team Leaders will report to ranking fire department officer at fire site on his arrival.
- Fire department personnel will not enter process buildings or tank pits. They will provide equipment, support, and rescue services to Plant Fire Teams."

Your plant-specific Contingency Plan will, of course, be organized and worded as is best suited to your facility. However, the point of the above example is that the Coordinated Emergency Services part of the Plan, and all other parts, should be presented as instructions to your personnel. The Contingency Plan should be specific regarding what to do, who to notify, and in the case of off-plant assistance, what those groups will and will not do during the emergency.

List of Emergency Coordinators (§264.52(d))--A list of names, addresses, and phone numbers (office and home) of all persons qualified to act as emergency coordinators (see §264.55) in the order in which they will assume responsibility must be included. The choice of emergency coordinator and alternates is extremely important. Since §264.55 requires that the emergency coordinator "must have the authority to commit the resources needed to carry out the contingency plan," it is strongly suggested that you consider personnel from facility management positions for the required list. Additional guidance on choosing emergency coordinators is provided in this section of the manual in the discussion of §264.55.

The provisions of §264.52(d) require only that the list of emergency coordinators be included in the Contingency Plan. However, from an operational standpoint, copies of this list should probably be posted in various parts of the facility such as control rooms and guardhouses.

Note that this list of emergency coordinators does not have to be submitted with your application for new facilities. In these cases, the list can be submitted at any time before you begin operations at the completed facility. Although you may not be able to supply names and associated details on emergency coordinators for a new facility at the time of application submittal, you should consider identifying the personnel by position title when you submit your application.

Table 5-21 is an example of a format that could be used for the emergency coordinators list. Ideally, there would be one person from the list at the facility (onsite) at any given time. Alternatively, the primary coordinator should be the most senior member of the staff closest to the facility. In addition to a list such as this, it is recommended that you identify the onsite emergency coordinator for those periods (nights, weekends, vacations) when the primary emergency coordinator is not onsite.

List of Emergency Equipment (§264.52(e))--You must list all emergency equipment at the facility that is applicable to facility operations. Include the location, a physical description, and the capabilities of each item listed. As specified in §264.32, the list must include the following:

- Internal communication or alarm system
- External communication system
- Fire extinguishing systems (including primary and secondary water supplies)
- Spill control equipment

In addition to listing the emergency equipment, the Contingency Plan must include a physical description of each item on the list, provide its location, and give a brief outline of its capabilities. Remember that this list will be used by your personnel during an emergency. The format chosen for the list should, therefore, allow identification of any needed equipment and its location in the easiest possible manner. It is suggested that a plot plan showing the locations of the equipment also be included in the Contingency Plan.

Evacuation Plan (§264.52(f))--An evacuation plan for the safe egress of facility personnel must be developed. Recognizable signals to commence an evacuation, routes, alternate evacuation routes (in case primary exit routes are blocked by releases of hazardous waste or fires), and safe assembly areas to account for all evacuated personnel should be noted in the plan. Maps

TABLE 5-21. EMERGENCY COORDINATORS LIST

NOTE: CONTACT IN ORDER LISTED (SEE NOTE 1)

Date: ____________

Supersedes all lists dated: ____________
and earlier.

	Name & home address	Telephones Work	 Home	Availability on-site	Comments
PRIMARY	John Gregson 15 Park Dr. Acton	X 500	(555)690-4673	Mon.-Fri. 08:00 a.m.-05:00 p.m. Sat. 09:00 a.m.-Noon	• J. G. must be notified of all emergency situations. • See Note 2.
ALTERNATES	Bill Johnson 180 Boston St. Middleton	X 503 Page: 760	(555)919-5623	Mon.-Fri. 08:00 a.m.-05:00 p.m. Sun. Noon-05:00 p.m.	• B. J. must be called in for all emergency situations. • See Note 1.
	Sam Houston 17 Sycamore St. Grey	X 520 Page: 768	(555)523-5772	Mon.-Fri. 04:30 p.m.-01:00 a.m.	
	Steve Sforza 1919 Columbia Ave. Athol	X 534 Page: 773	(555)734-7872	Tues.-Sat. 12:30 a.m.-08:30 a.m.	
	Dave McNulty 63 Bourne Dr. Middleton	X 557 Page: 771	(555)774-6051	Rotating	• Guardhouse will know if McNulty is on-site.

NOTE 1: On nights (2nd and 3rd shifts) and weekends contact Coordinator on-site first - then contact B. Johnson.

NOTE 2: Alternative home phone for Gregson is (617)224-9139 on weekends.

clearly delineating evacuation routes, fire fighting equipment, alarms and assembly areas should be prepared. In addition, the applicant should note the presence of employee training sessions, fire drills, and the placement of evacuation maps posted at the facility.

Table 5-22 is an example of an Evacuation Plan format and content. The Evacuation Plan is extremely important to insure that employees are safely removed from danger and are not inhibiting plant and outside emergency personnel from effectively dealing with the emergency. The plan in Table 5-22 is only an example. You will have to develop an Evacuation Plan specific to the needs of your facility and it must be included in your Contingency Plan document.

Copies of Contingency Plan [§264.53]. The applicant must submit a copy of the Contingency Plan to the EPA Regional Administrator with Part B of the permit application. In addition, copies of your Contingency Plan and all revisions to the plan must be:

(a) maintained at the facility; and

(b) submitted to all local police departments, fire departments, hospitals, and State and local emergency response teams that may provide emergency services to the facility.

It is suggested that numbering the individual copies of the Contingency Plan and keeping a log of where each copy is located will assist in updating the Plan when necessary. Regardless, your permit application should state how many copies of your Contingency Plan exist and to whom the copies were given. Your application should also state how many copies are retained at your facility and, as specifically as possible, where they are located.

Amendment of Contingency Plan [§264.54]. The Contingency Plan must be reviewed and immediately amended, if necessary, whenever:

(a) The facility permit is revised;

(b) The plan fails in an emergency;

(c) The facility design, construction, operation, maintenance, or other circumstances change to increase the potential for fires, explosions, or releases of hazardous waste or hazardous waste constituents, or changes the response necessary in an emergency;

(d) The list of emergency coordinators changes; or

(e) The list of emergency equipment changes.

clearly delineating evacuation routes, fire fighting equipment, alarms and assembly areas should be prepared. In addition, the applicant should note the presence of employee training sessions, fire drills, and the placement of evacuation maps posted at the facility.

Table 5-22 is an example of an Evacuation Plan format and content. The Evacuation Plan is extremely important to insure that employees are safely removed from danger and are not inhibiting plant and outside emergency personnel from effectively dealing with the emergency. The plan in Table 5-22 is only an example. You will have to develop an Evacuation Plan specific to the needs of your facility and it must be included in your Contingency Plan document.

Copies of Contingency Plan [§264.53]. The applicant must submit a copy of the Contingency Plan to the EPA Regional Administrator with Part B of the permit application. In addition, copies of your Contingency Plan and all revisions to the plan must be:

(a) maintained at the facility; and

(b) submitted to all local police departments, fire departments, hospitals, and State and local emergency response teams that may provide emergency services to the facility.

It is suggested that numbering the individual copies of the Contingency Plan and keeping a log of where each copy is located will assist in updating the Plan when necessary. Regardless, your permit application should state how many copies of your Contingency Plan exist and to whom the copies were given. Your application should also state how many copies are retained at your facility and, as specifically as possible, where they are located.

Amendment of Contingency Plan [§264.54]. The Contingency Plan must be reviewed and immediately amended, if necessary, whenever:

(a) The facility permit is revised;

(b) The plan fails in an emergency;

(c) The facility design, construction, operation, maintenance, or other circumstances change to increase the potential for fires, explosions, or releases of hazardous waste or hazardous waste constituents, or changes the response necessary in an emergency;

(d) The list of emergency coordinators changes; or

(e) The list of emergency equipment changes.

TABLE 5-22. EMERGENCY EVACUATION PROCEDURES

PURPOSE: Plan for safe evacuation in the event of an emergency.

RESPONSIBILITIES:

1. The Emergency Coordinator is responsible for implementing the evacuation procedure.

2. Each Area Monitor is responsible for directing employees and visitors in his/her section to the proper exit and their assigned safe area outside (see assignments).

PROCEDURE:

1. The Emergency Coordinator will notify supervisors and Area Monitors if an evacuation may be necessary.

2. The Emergency Coordinator will assess the conditions and order an evacuation or other actions required.

3. When an evacuation is announced stop work. The Area Monitors will direct employees in their areas to the closest available exit.

4. All employees must leave the facility and report to the designated assembly area. Do not run. Do not linger in entrance ways or driveways, stay together in your assigned safe area.

5. Each employee must report to his/her Area Monitor once outside the building.

6. Each Area Monitor must report to the Emergency Coordinator when his/her employees have cleared the facility.

7. The Emergency Coordinator will notify the Area Monitors when it is safe to re-enter the facility.

8. Stay outside the facility until notified by the Area Monitors to re-enter.

EVACUATION ROUTES, EXIT ASSIGNMENTS:

1. The attached floor diagrams (see Figure 7A) of Company X show each section of the office area and facility and the best route for each section to use when evacuating the building. Fire alarms and fire extinguishers are also noted on the diagrams.

2. The designated assembly areas for each section of the facility are shown in Figure 7A.

(continued)

TABLE 5-22 (continued)

EMERGENCY PRECAUTIONS:

1. Keep calm, think, avoid panic and confusion.
2. Know all exit locations: Be sure you know the safest and quickest way out of all buildings.
3. Do not lock office doors when vacating the facility. The Emergency Coordinator and emergency support personnel must have visual access to all areas to ensure that the facility is clear of personnel.
4. Do not delay evacuation of the facility for any reason.
5. Do not assist in fire control unless properly trained and qualified.
6. Do not use voice paging system. The paging system must be left open for issuing plantwide instructions.
7. When evacuating the facility WALK to the nearest safe exit. Report to the safe areas away from the buildings and wait for instructions.
8. Keep out of the way, stay clear of the facility, and DO NOT interfere with emergency operations.
9. DO NOT reenter the facility until instructed to do so.

The requirements of this section (§264.54) are intended for owners or operators of facilities that have previously prepared and submitted a Contingency Plan with Part B of their permit application. Amendments would be required only after EPA approval of the initial Contingency Plan and if one or more of the aforementioned conditions exist at the applicant's facility. Because the Contingency Plan will be a condition to your facility permit, any amendments to it will be judged a modification to the facility permit. However, changes to the lists of emergency coordinators or emergency equipment constitute minor modifications to the permit.

Because of the importance of this document during emergency situations, you should consider identifying a specific person, by name or title, who would be responsible for all revisions to all copies, on a periodic basis and on an "as needed" basis. Your permit application should clearly indicate how the copies of your Contingency Plan will be amended when the need arises. You should place special emphasis on how offsite copies of the plan will be amended and, especially, how you will be assured that amendments are incorporated into those copies.

Emergency Coordinator [§264.55]. The applicant should select at least one employee who is either on the facility premises during peak operational periods (preferred) or available to respond to an emergency by reaching the facility within a short period of time. This employee should be designated the primary emergency coordinator. The emergency coordinator is responsible for coordinating all emergency response measures, and being thoroughly familiar with:

(a) the facility's contingency plan,

(b) all operations and activities at the facility,

(c) the location and characteristics of waste handled,

(d) the location of all records within the facility, and

(e) the physical layout of the facility.

The selected emergency coordinator should have the authority to expend funds and recruit employees to implement the Contingency Plan. The owner/operator should also select alternative employees to act as emergency coordinators if for some reason the designated emergency coordinator is unavailable.

Your selection of the proper primary emergency coordinator and alternatives is extremely important to successful implementation of your Contingency Plan, when and if it needs to be implemented in an emergency. The agency reviewing your application will pay particular attention to the qualifications of the persons named in your Contingency Plan. You should therefore include in your application a brief biographical sketch of the background and experience of the named personnel with your justification for appointing them as emergency coordinators. Your application should also describe how the coordinators will be contacted in an emergency and who is responsible for insuring that notification.

Because §264.55 requires that your emergency coordinator have the authority to commit company resources in an emergency situation, you should consider naming only the highest-ranking personnel to positions as coordinators. If a named coordinator must continually contact an offsite senior executive for approval of his actions, it is unlikely that the reviewing agency will approve his designation as a coordinator. However, it may be acceptable in certain cases to identify less senior personnel as emergency coordinators for second and third shifts and weekends provided that the person identified will act in that capacity only for the period required for a senior executive to arrive from offsite and assume primary emergency coordinator responsibilities.

The following two examples are offered to indicate the detail which your discussion of emergency coordinators should achieve in your permit application. The first example addresses the biographical and experience qualifications that would justify the choice of a coordinator. The second example addresses the type of discussion on notification of coordinators that should be in your application. Both examples are based on the example list of emergency coordinators presented previously in Table 5-21.

> Example 1: "Mr. John Gregson has been selected as primary emergency coordinator for this company. Mr. Gregson is a civil engineer and has been employed at this company for 12 years. He is presently Plant Manager at the facility. During his employ he has participated in the planning and operation of all facility activities. He is well suited for this position because he assisted in the preparation and review of the Contingency Plan and is thoroughly familiar with the facility, operations and activities, and location of records. As Plant Manager, Mr. Gregson has the necessary authority to commit resources to implement the Contingency Plan."
>
> Example 2: "The list of emergency coordinators is contained in all copies of the Contingency Plan. In addition, it is posted next to the outside phones in all three control rooms and in the two Guardhouses. The Shift Supervisor in the area where the emergency occurs is responsible for notifying the emergency coordinator. If the Shift Supervisor is not in the control room at the time the emergency occurs, a senior operator in each control room has been identified and instructed to notify the emergency coordinator.
>
> During second and third shifts and on weekends the onsite emergency coordinator (Mr. Houston, Mr. Sforza, or Mr. McNulty) will immediately call in Mr. Bill Johnson, who is the Chief Plant Engineer, and resides

4 miles from the plant. The onsite coordinator will implement his duties and transfer them to Mr. Johnson on his arrival. When Mr. Johnson cannot be called in, Mr. Gregson will be called in."

Emergency Procedures [§264.56]. The applicant must discuss emergency procedures in the Contingency Plan in his application. The emergency procedures required to comply with §264.56 are explicitly outlined in the standard. The responsibility for implementing the procedures are divided between the emergency coordinator and the owner or operator of the facility. The eight (8) emergency procedures implemented by the emergency coordinator when a fire, explosion or hazardous waste release occurs are:

(a) Active facility alarms and notify appropriate State or local agencies;

(b) Identify the character, exact source, amount, and areal extent of any released material;

(c) Assess possible direct and indirect hazards to human health or the environment that may result from the release, fire, or explosion;

(d) Determine if evacuation of local areas is required, and immediately notify either the government official designated as on-scene coordinator or the National Response Center;

(e) Insure that fires, explosions, and releases do not occur, recur, or spread to other hazardous waste at the facility;

(f) Monitor for leaks, pressure buildup, gas generation, or ruptures in valves, pipes, or other equipment if facility operations cease;

(g) Provide treatment, storage, and disposal of any material that results from a release, fire, or explosion immediately after an emergency; and

(h) Insure that no waste incompatible with the released material is processed until cleanup procedures are completed and all emergency equipment listed in the Contingency Plan is cleaned and fit for its intended use.

The two (2) emergency procedures implemented by the owner or operator of the facility are:

(a) Notify the EPA Regional Administrator and State and local authorities that the facility is in compliance with §264.56(h) before operations commence; and

(b) Record the time, date, and details of any incident that requires implementing the Contingency Plan and submit a written report on the incident to the EPA Regional Administrator within 15 days of the incident.

Your Contingency Plan must contain specific instructions for the emergency coordinator to follow and implement. The contents of §264.56 indicate what the emergency coordinator must do and your Contingency Plan should be specific as to how those items will be accomplished by listing specific steps that the coordinator will take. You should include a discussion of these steps in your permit application that will identify what instructions in the Contingency Plan emergency procedures are intended to address the eight specific items in §264.56(a) through (h). However, because Contingency Plan must be facility specific, it is likely that additional procedures will be necessary.

The steps which the owner or operator must take after the emergency is over are presented in §264.56(i) and (j). The Contingency Plan should indicate how the owners or operators will confirm that the facility is in compliance with §264.56(h).

The Contingency Plan should also include specific instruction on how to prepare the report required by §264.56(j). Your discussion of the owner's and operator's responsibility in your permit application should identify the specific places in the Contingency Plan where procedures designed to comply with §264.56(i) and (j) are located.

Contingency Plan Requirements for Surface Impoundments (§264.227). Subpart K of Part 264 contains requirements for surface impoundments. In particular, §264.227 presents criteria for when a surface impoundment must be removed from service in §264.227(a) and what must be done to remove it from service in §264.227(b). Section 264.227(c) then requires that procedures for complying with the requirements of §264.227(b) must be specified in the Contingency Plan.

5.7.3 List of Major Points

1. Does your company have a Contingency Plan? Can another plan be amended to comply with Subpart D?

2. Describe in detail the emergency procedures and evacuation plan of your facility.

3. Identify all key personnel and equipment required to implement the plan.

Additional background discussion on the Contingency Plan can be found in the preamble on Subpart D in the May 19, 1980 Federal Register at page 33183.

5.8 GENERAL HAZARD PREVENTION

5.8.1 Regulatory Citations

Information on hazard prevention must be submitted with Part B of the permit application, as required by:

> "270.14(b)(8) A description of procedures, structures, or equipment used at the facility to:
>
> (i) Prevent hazards in unloading operations (for example, ramps, special forklifts);
>
> (ii) Prevent run-off from hazardous waste handling areas to other areas of the facility or environment, or to prevent flooding (for example, berms, dikes, trenches);
>
> (iii) Prevent contamination of water supplies;
>
> (iv) Mitigate effects of equipment failure and power outages; and
>
> (v) Prevent undue exposure of personnel to hazardous waste (for example, protective clothing)."

The §270.14(b)(8) regulatory requirements do not identify specific Part 264 standards with which the application information must prove compliance. However, the five informational items identified in §270.14(b)(8) are clearly stated and are likely to be addressed by information developed for and included in the Part B application for other purposes.

5.8.2 Guidance to Achieve the Part 264 Standards

The requirements of §270.14(b)(8) do not identify any specific Part 264 standards. However, the intent of requiring a description of procedures, structures, or equipment used in hazard prevention is to draw the applicant's attention to the five potential sources of hazards which are listed in §270.14(b)(8).

It is likely that another part of your application may already identify procedures, structures, or equipment applicable to the five items in §270.14(b)(8). In those cases, you can either repeat or reference those discussions to demonstrate compliance with §270.14(b)(8). Specifically, the requirements of §270.14(b)(8)(i)(iv), and (v) may well be addressed in your discussion of preparedness and prevention or your Contingency Plan (see Sections 5.6 and 5.7 of this manual). Likewise, the run-off requirement of §270.14(b)(8)(ii) will be addressed in your response to your facility's specific design standards in Part 264 and flooding will be addressed in your analysis of facility location required by §270.14(b)(11) (see Section 5.11 of this manual). The requirements of §270.14(b)(8)(ii) will be addressed in your discussion of compliance with Subpart F of Part 264. The specific request for information identified by §270.14(b)(8) should also serve as a check that you have addressed these issues adequately in other portions of your Part B permit application.

When identifying and discussing procedures, structures, or equipment used at your facility to prevent hazards in unloading operations, you should also present information regarding loading operations if applicable. In order to be thoroughly responsive to §270.14(b)(8)(i), your discussion should indicate that you have identified the potential hazards that exist or could result during loading and unloading and have taken positive steps to minimize or eliminate the likelihood of their occurrence.

Your facility's run-off controls, flooding potential, and flood control measures are likely to have been presented in your permit application under the discussions to demonstrate compliance with facility design and location standards. However, in your response to §270.14(b)(8)(ii), you should also consider demonstrating that drainage in and around your facility is sufficient to handle short duration, high intensity storm events. Even if your facility is not in a 100-year floodplain, surface drainage during short duration, high intensity storms could result in flooding because of the topography around your facility. You should consider addressing this issue in your permit application. At a minimum, your discussion to address §270.14(b)(8)(ii) should reference the locations in your application where the details of your run-off and flood prevention procedures, structures, or equipment are presented.

The overall intent of the Part 264 standards, and especially Subpart F of Part 264, is the protection of ground water and surface water. Your response to §270.14(b)(8)(iii) should be used to summarize the key features of your facility's procedures, structures, or equipment that are intended to prevent contamination of water supplies. Your discussion should direct an application reviewer to the parts of your application where details are presented.

Any procedures, structures, or equipment that are used to mitigate the effects of a power outage or equipment failure should be addressed in detail in your Contingency Plan (see Section 5.7 of this manual). Thus, your response to §270.14(b)(8)(iv) could be a summary which also references the portions of your application and Contingency Plan where details are presented. You need only address equipment failures and power outages to the extent that their occurrence has the potential to cause a violation of your permit or a release of hazardous waste. However, you should address equipment failures over which you have no control, either because they result from acts of nature or because the equipment is maintained by a supplier.

When you prepare a response to §270.14(b)(8)(v), you should address both routine and emergency procedures, structures, or equipment that will be employed to protect personnel from undue exposure to hazardous waste. Your Contingency Plan should address emergencies and can be referenced for compliance with the §270.14(b)(8)(v) requirement. However, routine personnel protection must also be discussed. Subpart I--Personal Protective Equipment of the Occupational Safety and Health Standards in 29 CFR 1910 should be used as guidance when addressing §270.14(b)(8)(v). The amount of training that personnel will receive in protection procedures, structures, or equipment should be indicated in your application. Passive personnel protection items should also be identified.

5.8.3 List of Major Points

1. Have each of the five hazard prevention areas been discussed in the application?
2. Have other locations in the application where details can be found been properly referenced?

5.9 PREVENTION OF IGNITION OR REACTION OF WASTES

5.9.1 Regulatory Citation

Information on precautions employed to prevent accidental waste ignition or reaction must be submitted with Part B of the permit application, as specified in:

> "§270.14(b)(9) A description of precautions to prevent accidental ignition or reaction of ignitable, reactive, or incompatible wastes as required to demonstrate compliance with §264.17 including documentation demonstrating compliance with §264.17(c)."

The regulatory requirements regarding the precautions required are contained in §264.17. They are:

> "§264.17 General requirements for ignitable, reactive, or incompatible wastes.
>
> (a) The owner or operator must take precautions to prevent accidental ignition or reaction of ignitable or reactive waste. This waste must be separated and protected from sources of ignition or reaction including but not limited to: open flames, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electrical, or mechanical), spontaneous ignition (e.g., from heat-producing chemical reactions), and radiant heat. While ignitable or reactive waste is being handled, the owner or operator must confine smoking and open flame to specially designated locations. "No Smoking" signs must be conspicuously placed wherever there is a hazard from ignitable or reactive waste.
>
> (b) Where specifically required by other Sections of this Part, the owner or operator of a facility that treats, stores, or disposes ignitable or reactive waste, or mixes incompatible waste or incompatible wastes and other materials, must take precautions to prevent reactions which:
>
> (1) Generate extreme heat or pressure fire or explosions, or violent reactions;
>
> (2) Produce uncontrolled toxic mists, fumes, dusts, or gases in sufficient quantites to threaten human health or the environment;
>
> (3) Produce uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosions;
>
> (4) Damage the structural integrity of the device or facility;
>
> (5) Through other like means threaten human health or the environment.
>
> (c) When required to comply with paragraphs (a) or (b) of this Section, the owner or operator must document that compliance. This documentation may be based on references to published scientific or engineering literature, data from trial tests (e.g., bench scale or pilot scale tests), waste analyses (as specified in §264.13), or the results of the treatment of similar wastes by similar treatment processes and under similar operating conditions.

In addition to the "general" requirements contained in §264.17, there are facility-type specific information requirements in Part 270 and associated specific standards in Part 264. The following list identifies where these specific requirements can be located.

Facility Type	Specific information requirements	Specific standards
Containers	§270.15(c) and (d)	§264.176, §264.177
Tanks	§270.16(f)	§264.198, §264.199
Surface Impoundments	§270.17(h) and (i)	§264.299, §264.230
Waste Piles	§270.18(g) and (h)	§264.256, §264.257
Land Treatment	§270.20(g) and (h)	§264.281, §264.282
Landfills	§270.21(f) and (g)	§264.312, §264.313

5.9.2 Guidance to Achieve the Part 264 Standards

5.9.2.1 General--

The intent of the precautionary requirements is to reduce the potential for accidental ignition or reaction of ignitable and/or reactive wastes, or the mixing of incompatible wastes by insuring that facility personnel are thoroughly familiar with the prevailing dangers, and more significantly that the design of the facility and the devices utilized for treating, storing, and transporting wastes account for these dangers.

Ignitability is exhibited by a solid waste if it has any of the four properties listed in §261.21(a). More specifically, §261.21(a)(1) addresses liquids, §261.21(a)(2) addresses nonliquids, §261.21(a)(3) addresses compressed gases, and §261.21(a)(4) addresses oxidizers. The provisions of §261.21(a)(1) identify three ASTM standard methods that can be used to determine ignitability. They are:

- ASTM Standard D-93-79
- ASTM Standard D-93-80
- ASTM Standard D-3278-78[1]

These methods are also described along with test methods for gases and oxidizers in Section 2.1.1 of "Test Methods for Evaluating of Solid Waste, Physical/Chemical Methods" (July 1982) Second Edition (SW-846).[2] (Addresses of Government Printing Office Book Stores and EPA Regional Libraries are provided in Appendix A.)

Reactivity is exhibited by a solid waste if it has any of the eight properties listed in §261.23(a). These properties are based largely upon the definitions employed by the National Fire Prevention Association. Detailed information on identification and testing of reactive wastes is presented in Section 2.1.3 of SW-846 and in Section 5.3 of this manual.

The owner or operator of a facility which handles ignitable or reactive wastes, or which mixes incompatible wastes, or wastes and materials which are incompatible must take precautions against reactions which:

(1) Generate extreme heat or pressure, fire or explosions, or violent reactions;

(2) Produce uncontrolled toxic mists, fumes, dusts, gases in sufficient quantities to threaten human health or the environment;

(3) Produce uncontrolled flammable fumes or gases which, in sufficient quantities, pose a risk of fire or explosion;

(4) Damage the structural integrity of the device or facility;

(5) Through other means threaten human health or the environment.

The precautions taken to prevent these reactions would generally encompass:

- Identification of ignitable, reactive, and incompatible wastes
- Identification of the ways that incompatible wastes are combined
- Identification of the sources of ignition and reaction (as indicated in §264.17(a))
- Analysis of the storage devices used, and their placement in the facility, should the wastes be stored as they are
- Analysis of methods of treatment which would render wastes unreactive or nonignitable, and subsequent testing to insure that the wastes are no longer ignitable or reactive.

5.9.2.2 Precautions (§264.17 and 270.14(b)(9))--

Identification of Ignitable, Reactive, and Incompatible Wastes--In Part 261, Subpart D, hazardous wastes are listed. Ignitable wastes are identified by an "(I)" and reactive wastes are identified by an "(R)". However, these listings will not provide all the information you will need to identify ignitable, reactive, or otherwise incompatible wastes. It is recommended that you review Section 5.3, Waste Analysis Plans, to determine applicable procedures for characterizing these wastes.

Because many types of hazardous waste are extremely reactive, the compatibility of hazardous wastes to be combined must be thoroughly evaluated in order that the aforementioned reactions be prevented. The applicant must identify the methods which he will employ for estimating the potential consequences of mixing different classes of waste.

Identification of the Ways Incompatible Wastes are Combined--The primary cause of combining incompatible wastes is insufficient or inaccurate information about a waste or wastes. Regardless of the efforts to adequately characterize wastes via the waste analysis plan, properties of some wastes may change with time and temperature, thereby producing more or different hazardous components.

A second cause of accidents is the indiscriminate handling of waste, which might encompass the following:

- Containers which are supposedly empty, but may contain incompatible residual wastes.
- Haulers may "top off" their load on the way to the disposal site.
- Rough handling could cause container rupture or leakage that might result in comingling of otherwise segregated incompatible wastes.
- Indiscriminate disposal of containerized incompatible wastes in the same cell could result in incompatible waste mixing, once the containers corrode and leak.

5.9.2.3 Sources of Ignition or Reaction (§264.17(a))--

The regulations list several sources of ignition or reaction from which the ignitable or reactive wastes must be separated and protected including but not limited to:

- Open flames,
- Smoking,
- Cutting and welding,
- Hot surfaces,
- Frictional heat,
- Sparks (static, electrical, or mechanical),
- Spontaneous ignition (e.g., from heat-producing chemical reactions), and
- Radiant heat.

While many of these are self-explanatory, there are three sources which bear further comment.

Special precautions must be taken against smoking by personnel in facilities handling ignitable or reactive wastes. While the wastes are being handled, smoking must be confined to specially designated areas. Warnings against smoking should be clearly displayed to all occupants of the facility. "No Smoking" signs should be placed conspicuously in areas where hazards exist from smoking or open flames.

The facility owner and operator must take care as well in the equipment used in the handling of these wastes. Tools and machinery which are used in handling ignitable or reactive wastes should be constructed of nonsparking materials. For example, when placing containers of waste in a landfill, it is recommended that a tractor barrel grappler be employed. Such equipment allows the operator to accurately place the containers in a landfill, while greatly minimizing the risks of damage to the container or ignition or reaction due to spark-producing equipment.

The ignitable or reactive wastes, particularly the ignitable wastes, should be segregated from other wastes which may generate radiant heat or cause spontaneous ignition. For example, ignitable wastes will have to be segregated from other wastes which may be subject to microbial degradation or wastes which may be subject to exothermic reaction with water.

Storage Devices--Containers, Tanks, Waste Piles--If the owner or operator of the hazardous waste management facility chooses to store or dispose of wastes which are ignitable or reactive, special precautions must be taken in the selection of the devices employed. Wastes which are reactive or ignitable may not be placed in a landfill untreated. Ignitable or reactive wastes stored in containers should not be placed near a waste pile, container, tank, or surface impoundment which contains a waste or wastes which are incompatible, unless separated and protected by means of a dike, berm, wall, or other structure. The container must be in good condition (e.g., no apparent rusting or structural defects). The permit reviewer may require that all containers meet the container requirements of the Department of Transportation Regulations.

For storage of ignitable, reactive, or incompatible waste in tanks, it is necessary that the buffer zone requirements in the National Fire Prevention Association's publication "Flammable and Combustible Code--1977" in Tables 2-1 and 2-6[3] be complied with. Wastes must not be placed in unwashed tanks which previously held incompatible wastes or materials.

An ignitable or reactive waste may only be placed in a waste pile if the addition of that waste to an existing pile results in the waste or mixture no longer meeting the definition of ignitable or reactive waste as specified in §261.21 and §261.23, respectively.

Treatment Methods--A number of methods are available to treat, render, or mix wastes so that they are no longer ignitable or reactive. Several treatment processes which previously were only used in the organic or inorganic chemical industry are being considered for broader applications in the treatment of hazardous wastes.

The rendering of ignitable or reactive compounds nonignitable or unreactive may be accomplished by diluting the waste with other compatible material. There are several disadvantages to doing this, however. Hazardous reactions may result if the materials being mixed are incompatible. Dilution of liquids is also undesirable because of added liquids involved. For example, disposal of diluted wastes in a landfill would result in greater leachate generation. If the quantities of wastes are relatively small, dilution may be the most economical precautionary measure.

Incineration may be considered as a method to render reactive or ignitable wastes nonreactive or nonignitable. Ignitable hazardous wastes, containing solvents and other organic materials are easily incinerated. Incineration reduces waste volume and may also reduce the potential for ground water contamination from the ash compared to that associated with disposing of the parent waste. On the other hand, compliance with air emissions standards requires emissions evaluation.

After treatment processes are complete, the owner/operator must conduct testing, or document by some other means, that the waste is no longer ignitable or reactive. If testing is employed, specification of the testing procedure must be provided. Available methods to test for ignitability are set forth in §261.21. Two test methods are acceptable for determining the flashpoint: Pensky-Martens Closed Cup Tester using the test method specified in ASTM Standard D-93-79 or D-93-80, or a Steaflash Closed Cup Tester, using the test method specified in ASTM Standard D-3278-78. To test for reactivity, the applicant should base the demonstration on tests for: water reactivity, flashpoint/flammability, oxidation/reduction potential, pH, and the presence of cyanide or sulfide. The testing procedures should conform with the ASTM Standards and test methods incorporated in SW-846. As stated in §264.17(c), documentation of compliance may be based upon references to published scientific or engineering literature, data from trial tests, waste analyses, or the results of the treatment of similar wastes by similar treatment processes and under similar operating conditions.

5.9.2.4 Documentation (§264.17(c))--

Documentation of the precautions taken by the owner or operator of a hazardous waste management facility handling ignitable or reactive wastes to prevent accidental ignition or reaction is required in the permit application. The documentation will involve a complete description of the precautions taken, and how they serve to comply with the §264.17 regulations. The permit application may be judged to be deficient if the required documentation is not submitted or is judged to be inadequate.

Specifically, you should list the ignitable and/or reactive or the incompatible wastes to be handled, stored, or disposed of at the facility. If methods other than those referenced in the regulations have been employed to determine ignitability or reactivity (which have been approved by the Administrator), they must be detailed. The methods employed for estimating the potential consequences of mixing different wastes should be documented.

The sources of ignition and reaction present in the facility should be identified and described. The precautions for prevention of sparking should be described, as well as the other measures employed to separate and protect the wastes from open flames, smoking, cutting and welding, hot surfaces, frictional heat, and spontaneous ignition (e.g., from heat-producing chemical reactions and radiant heat). Describe how smoking and open flames are confined to specifically designated locations when ignitable and/or reactive wastes are being handled, and how "No Smoking" signs are conspicuously placed wherever there is a hazard from such wastes.

Sketches, drawings, or data should be provided to demonstrate how containers of ignitable or reactive waste are to be located. Description of the container systems employed should be included, especially noting compliance with relevant standards (e.g., the National Fire Prevention Association's buffer zone requirements for tanks). If no treatment methods are employed, describe how the ignitable, reactive, or incompatible wastes are to be separated and protected. State which containment systems are to be employed for emergency usage.

If the wastes are to be treated, the treatment procedure used must be fully documented. Fundamentally, one must show how the method will ensure that the wastes no longer fulfill the requirements for classification as ignitable or reactive hazardous wastes. The testing methods employed should also be fully documented.

As you will note from the above description of the documentation necesary, much of the information or data necessary to document that the proper precautions have been taken will be included in your application for other reasons. In these cases, you should reference the location of these materials in your application under your discussion to demonstrate compliance with the requirements of §270.14(b)(9). When you reference material in this manner, make certain that the referenced material does, in fact, describe the precautions taken to show compliance with §264.17 or include a brief discussion to "tie together" the referenced materials.

5.9.3 List of Major Points

1. Have you listed the ignitable, reactive, and incompatible wastes to be handled at your facility?
2. Have you documented the potential consequences of mixing of wastes?
3. Have you taken precautions to separate and protect ignitable or reactive wastes from sources of ignition or reaction located in your facility?
4. Have you designated special areas at your facility to which smoking and open flames must be confined, and placed "No Smoking" signs in all other locations?

5. Have you taken all necessary precautions in the selection and placement of containers and other storage devices?

6. Have you documented the methods employed to treat the ignitable or reactive wastes, and the methods employed to test the wastes following treatment?

7. Have you fully documented compliance with all pertinent sections of the regulations?

5.10 TRAFFIC

5.10.1 Regulatory Citations

Information related to traffic movement must be submitted with Part B of the permit application, as specified in:

> "§270.14(b)(10) Traffic pattern, estimated volume (number, types of vehicles) and control (for example, show turns across traffic lanes, and stacking lanes (if appropriate); describe access road surfacing and load bearing capacity; show traffic control signals).

Part 264 of the regulations does not specify any regulatory standards with which traffic movement must comply.

5.10.2 Guidance to Achieve the Standards

5.10.2.1 General--

The intent of requiring submittal of the traffic related information delineated in §270.14(b)(10) with the permit application is to insure that movement of hazardous waste, and simply traffic movement, will be conducted safely to minimize the risk of accidents.. The traffic related information required is only for that area inside and immediately surrounding the hazardous waste management facility.

As noted above, there are no "standards" in Part 264 with which traffic related items must comply. However, the overriding concern is safety. As an applicant, you should be concerned that the movement of hazardous waste into, out of, and within your facility will be conducted in a manner that minimizes accident potential. Additionally, general traffic movement should not be such that hazardous waste stored or disposed of at your facility will be disturbed. In order to present traffic related items most effectively in your permit application, it is suggested that both a discussion and a drawing be provided.

5.10.2.2 Traffic Patterns and Estimated Volumes--

You should provide a thorough description of both the pattern of general traffic and the pattern of traffic moving hazardous waste within your facility. A description of traffic on roadways traveled by the public which intersect with access roadways to your facility should also be provided. The following items should be considered for inclusion in your discussion of traffic patterns and volumes;

- routes traveled
- distances traveled
- number of vehicles

- types of vehicles
- waste movement sampling and unloading locations
- amount of pedestrian traffic

If traffic volumes vary with the time of day, or if routes will be varied, these variations should be identified. The following examples are intended to provide insight into how information on traffic patterns and volumes should be presented in your permit application. The first is an example presentation for an offsite landfill. The second is an example for an industrial facility which operates an onsite surface impoundment and a landfill.

Example 1:

"Plot plan xyz shows the roadways in and around our facility. Access gates are off Pine St. on the south side and off Lowell St. on the north side. At both gates, their is a 150-foot distance from the street to the gatehouse where all entering vehicles must stop. That area, plus the adjacent aprons shown, provide enough room for up to four tractor-trailer rigs to pull completely off the public roadway at each gate while waiting to be processed through the gates.

Pine St. is a two-lane road with a posted 40 MPH speed limit. It is moderately busy with passenger vehicles during the morning and evening rush hours but is only lightly traveled in off-peak hours. It is not a major connector, a short-cut, nor a school bus route.

Lowell St. is a four lane, divided surface artery with a posted speed limit of 45 MPH. It is heavily traveled during the morning and evening rush hours by passenger vehicles and trucks and moderately traveled during all the other daylight hours during which our facility operates. Lowell St. is not a school bus route.

Both entrances to our facility are equally used. Over the past year, an average of 45 trucks entered our facility per day. The majority of these (40) are ten-wheel flat-bed or open dump trucks. The remainder are 20 and 40 foot trailers. Occasionally, waste is brought to our site in pick-up trucks. During the period from March to May, an additional seven trucks per day (4 dump and 3 flat-bed) above average entered our facility during cleanup of the Reeseville Farm site.

As shown on plot plan xyz, vehicles entering our site travel the perimeter roads to the active portion of the landfill. Empty vehicles all use roadway A and turn left or right at intersection B toward their desired exit gate. Both the perimeter and exit roadways are clearly marked as one-way."

Example 2:

"Plot plan xyz shows the roadways within our facility. The landfill is labeled A and the surface impoundment is labeled B.

Hazardous wastes destined for the landfill are collected from the loading docks labeled 1 through 6. As shown in the plot plan, the collection truck (a ten-wheel flat-bed) uses one of the indicated routes from the loading docks to the west perimeter road and then to the landfill. Collections are scheduled for once per week on Wednesday and it typically requires three trips to complete the collections.

Hazardous wastes entering the surface impoundment are delivered directly by pipelines as described on page __ of this application. As shown on the plot plan, there is a plant roadway along the east side of the impoundment. A guardrail has been installed along that roadway at the impoundment.

Roadways in the plant are traveled by various company trucks, forklifts, and electric carts. All noncompany vehicles are restricted to the roadways marked on the plot plan. The hazardous waste collection truck routes do not follow or intersect the noncompany vehicle routes.

The plant speed limit is posted at 10 MPH. The hazardous waste collection truck is painted yellow and is equipped with a revolving amber light on the cab roof. All plant employees have been informed of the description and purpose of this truck. Plant traffic safety rules have established that this truck has the right-of-way at all times."

The plot plan and description of traffic in your application should also indicate traffic control signs and signals. If you have established special procedures for controlling vehicles containing hazardous wastes you should describe those procedures in your application.

You are also required to provide a description of roadway surfaces and load bearing capacity. The intent here is to insure that the roadways are appropriate for the type and number of vehicles which will be using them. Further, if the road surface is such that it will require periodic maintenance, you should consider describing the frequency and type of maintenance that will be undertaken to insure that the roadway will remain safe for vehicular traffic. The reviewing agency may also be concerned with the amount of dust that will be generated by vehicular traffic in and around your facility.

5.10.3 List of Major Points

1. Have vehicle routes been clearly indicated?
2. Has a description of the number and types of vehicles been provided?
3. Have traffic control signs, signals, and procedures been identified?
4. Has the adequacy of roadway surfaces and load bearing capacity for expected traffic been clearly demonstrated?

5.11 LOCATION INFORMATION

5.11.1 Regulatory Citations

Information on the location of the facility must be submitted with Part B of the permit application, as specified in:

> "§270.14(b)(11) Facility location information.
>
> (i) In order to determine the applicability of the seismic standard [§264.18(a)] the owner or operator of a new facility must identify the political jurisdiction (e.g., county, township, or election district) in which the facility is proposed to be located.
>
> (ii) If the facility is proposed to be located in an area listed in Appendix VI of Part 264, the owner or operator shall demonstrate compliance with the seismic standard. This demonstration may be made using either published geologic data or data obtained from field investigations carried out by the applicant. The information provided must be of such quality to be acceptable to geologists experienced in identifying and evaluating seismic activity. The information submitted must show that either:
>
> (A) No faults which have had displacement in Holocene time are present, or no lineations which suggest the presence of a fault (which have displacement in Holocene time) within 3,000 feet of a facility are present, based on data from:
>
> (1) Published geologic studies,
>
> (2) Aerial reconnaissance of the area within a five-mile radius from the facility.
>
> (3) An analysis of aerial photographs covering a 3,000 foot radius of the facility, and
>
> (4) If needed to clarify the above data, a reconnaissance based on walking portions of the area within 3,000 feet of the facility, or
>
> (B) If faults (to include lineations) which have had displacement in Holocene time are present within 3,000 feet of a facility, no faults pass with 200 feet of the portions of the facility where treatment, storage, or disposal of hazardous waste will be conducted, based on data from a comprehensive geologic analysis of the site. Unless a site analysis is otherwise conclusive concerning the absence of faults within 200 feet of such portions of the facility data shall be obtained from a subsurface exploration (trenching) of the area within a distance no less than 200 feet from portions of the facility where treatment, storage, or disposal of hazardous waste will be conducted. Such trenching shall be performed in a direction that is perpendicular to known faults (which have had displacement in Holocene time) passing within 3,000 feet of the portions of the facility where treatment, storage, or disposal of hazardous waste will be conducted. Such investigation shall document with supporting maps and other analyses, the location of faults found.

(iii) Owners and operators of all facilities shall provide an identification of whether the facility is located within a 100-year floodplain. This identification must indicate the source of data for such determination and include a copy of the relevant Federal Insurance Administration (FIA) flood map, if used, or the calculations and maps used where an FIA map is not available. Information shall also be provided identifying the 100-year flood level and any other special flooding factors (e.g., wave action) which must be considered in designing, constructing, operating, or maintaining the facility to withstand washout from a 100-year flood.

(iv) Owners and operators of facilities located in the 100-year floodplain must provide the following information:

(A) Engineering analysis to indicate the various hydrodynamic and hydrostatic forces expected to result at the site as consequence of a 100-year flood.

(B) Structural or other engineering studies showing the design of operational units (e.g., tanks, incinerators) and flood protection devices (e.g., floodwalls, dikes) at the facility and how these will prevent washout.

(C) If applicable, and in lieu of paragraphs (b)(11)(iv)(A) and (B) above, a detailed description of procedures to be followed to remove hazardous waste to safety before the facility is flooded, including:

(1) Timing of such movement relative to flood levels, including estimated time to move the waste, to show that such movement can be completed before floodwaters reach the facility.

(2) A description of the location(s) to which the waste will be moved and demonstration that those facilities will be eligible to receive hazardous waste in accordance with the regulations under Parts 270, 271, 124, and 264 through 266 of this Chapter.

(3) The planned procedures, equipment, and personnel to be used and the means to ensure that such resources will be available in time for use.

(4) The potential for accidental discharges of the waste during movement.

(v) Existing facilities NOT in compliance with §264.18(b) shall provide a plan showing how the facility will be brought into compliance and a schedule for compliance."

The regulatory requirements for facility location are contained in §264.18. They are:

"§264.18 Location standards.

(a) Seismic considerations. (1) Portions of new facilities where treatment, storage, or disposal of hazardous waste will be conducted must not be located within 61 meters (200 feet) of a fault which has had displacement in Holocene time.

(2) As used in paragraph (a)(1) of this Section:

(i) "Fault" means a fracture along which rocks on one side have been displaced with respect to those on the other side.

(ii) "Displacement" means the relative movement of any two sides of a fault measured in any direction.

(iii) "Holocene" means the most recent epoch of the Quarternary period, extending from the end of the Pleistocene to the present.

(b) Floodplains. (1) A facility located in a 100-year floodplain must be designed, constructed, operated, and maintained to prevent washout of any hazardous waste by a 100-year flood, unless the owner or operator can demonstrate to the Regional Administrator's satisfaction that:

(i) Procedures are in effect which will cause the waste to be removed safely, before flood waters can reach the facility, to a location where the wastes will not be vulnerable to flood waters; or

(ii) For existing surface impoundments, waste piles, land treatment units, and landfills, no adverse effects on human health or the environment will result if washout occurs, considering:

(A) The volume and physical and chemical characteristics of the waste in the facility;

(B) The concentration of hazardous constituents that would potentially affect surface waters as a result of washout;

(C) The impact of such concentrations on the current or potential uses of and water quality standards established for the affected surface waters; and

(D) The impact of hazardous constituents on the sediments of affected surface waters or the soils of the 100-year floodplain that could result from washout.

(2) As used in paragraph (b)(1) of this Section:

(i) "100-year floodplain" means any land area which is subject to a one percent or greater chance of flooding in any given year from any source.

(ii) "Washout" means the movement of hazardous waste from the active portion of the facility as a result of flooding.

(iii) "100-year flood" means a flood that has a one percent chance of being equalled or exceeded in any given year."

The regulations address two issues relative to a facility's location; seismic considerations and floodplains. The guidance provided in the following part of this section of the manual is organized under these two topical headings.

5.11.2 Guidance to Achieve the Part 264 Standards

5.11.2.1 Seismic Considerations--

Purpose--The intent of the regulation requiring consideration of seismic activity when locating a facility is to protect these facilities from the deformation and displacement of the earth's surface when an earthquake occurs and to prevent the release of hazardous waste that could result from damage to the facilities. At present (May 1983), the seismic standard applies only to the location of new hazardous waste facilities. Existing facilities do not have to comply with the seismic standard in §264.18(a). However, applicants seeking a permit for an existing facility are advised to contact the permitting authority (see Appendix A) to determine if any seismic standards are applicable at the time they are preparing Part B of their permit application. A flow diagram (Figure 5-3) is provided to summarize the location information requirements to meet the seismic standard of §264.18(a). For new facilities the political jurisdiction (e.g., county, township, or election district) in which the facility is proposed to be located must be identified and compared to the list of such jurisdictions provided in Appendix VI to Part 264 (Table 5-23). If the location is NOT listed in Appendix VI, no further information is required to demonstrate compliance with §264.18(a) (all other locations are assumed to be in compliance). If the location IS listed in Appendix VI, the applicant must demonstrate compliance with the seismic standard specified in §264.18(a).

Examples:

"The proposed facility is to be located in Tacoma, Washington, which lies in Pierce County. Appendix VI lists Pierce County and, therefore, we have demonstrated compliance with §264.18(a) in Section _ of this application."

"The proposed facility is to be located in Massachusetts. Appendix VI does not list Massachusetts and, therefore, we have provided no further information to demonstrate compliance with §264.18(a)."

The information which must be submitted by facilities that will locate in areas listed in Appendix VI of Part 264 to demonstrate compliance with §264.18(a) is identified in §270.14(b)(11)(ii). One of two compliance showings must be made, §270.14(b)(11)(ii)(A) addresses facilities which can be shown NOT to be located within 3,000 feet of a fault displaced in Holocene time and §270.14(b)(11)(ii)(B) covers facilities where such a fault is found within 3,000 feet of the facility.

In either case, the applicant must demonstrate compliance with the Seismic standard by using either:

- published geologic data, or

- data obtained from field investigations conducted or sponsored by the applicant.

Published geologic data includes any existing data which may be available to the applicant. Field investigations would entail original work performed by the applicant or representatives. Holocene time is the geologic epoch which represents approximately the last 11,000 years, although in some parts of the U.S., the limits of the Holocene may range from 10,000 to 15,000 years ago. Where deposits or landforms of known Holocene age are offset or displaced by faults, movement along the fault is established to have occurred within Holocene time.[1]

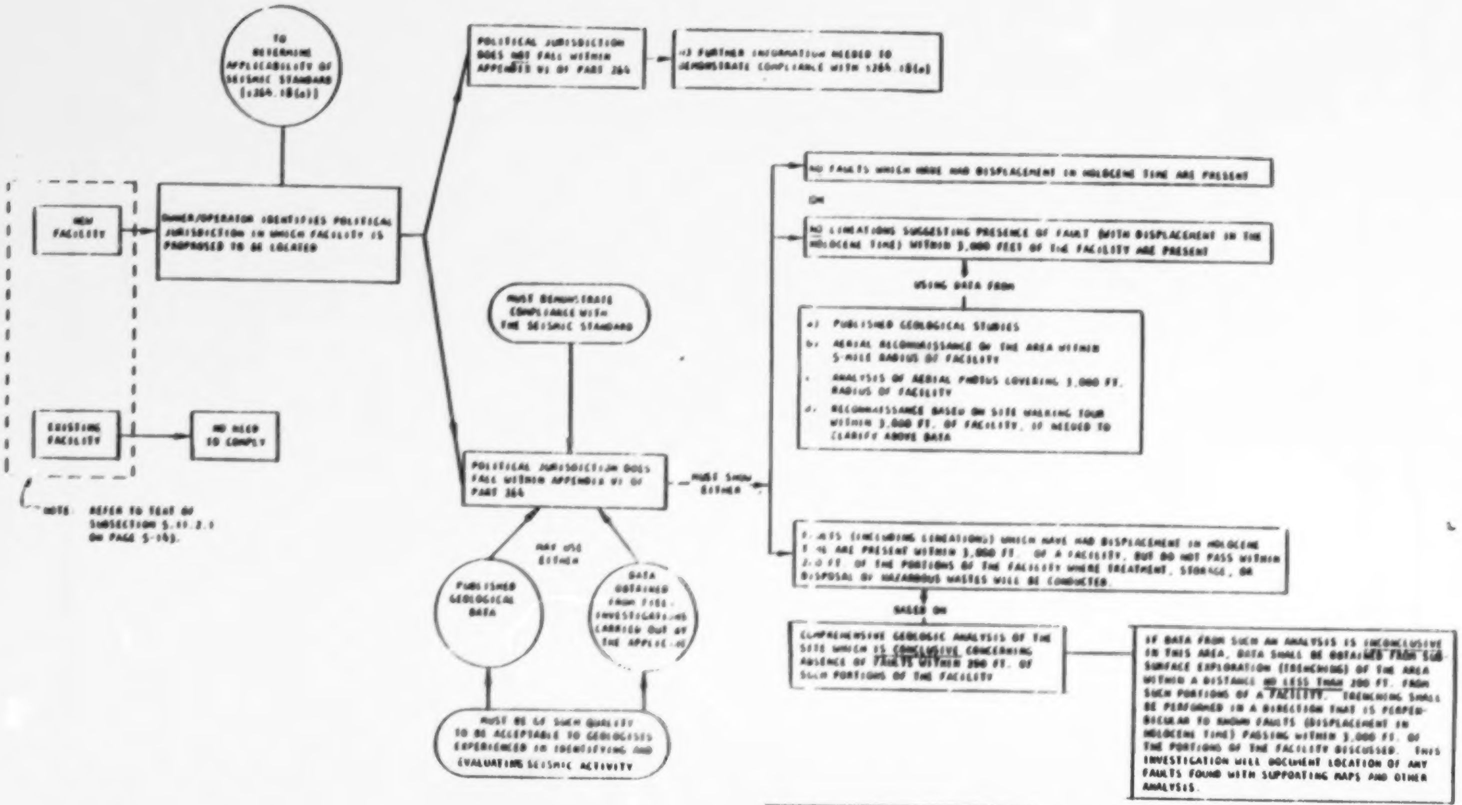
TO DETERMINE APPLICABILITY OF SEISMIC STANDARD [§264.18(a)]
NEW FACILITY
EXISTING FACILITY
NO NEED TO COMPLY
NOTE: REFER TO TEXT OF SUBSECTION 5.11.2.1 ON PAGE 5-143.
OWNER/OPERATOR IDENTIFIES POLITICAL JURISDICTION IN WHICH FACILITY IS PROPOSED TO BE LOCATED
POLITICAL JURISDICTION DOES NOT FALL WITHIN APPENDIX VI OF PART 264
NO FURTHER INFORMATION NEEDED TO DEMONSTRATE COMPLIANCE WITH §264.18(a)
MUST DEMONSTRATE COMPLIANCE WITH THE SEISMIC STANDARD
POLITICAL JURISDICTION DOES FALL WITHIN APPENDIX VI OF PART 264
MAY USE EITHER
PUBLISHED GEOLOGICAL DATA
DATA OBTAINED FROM FIELD INVESTIGATIONS CARRIED OUT BY THE APPLICANT
MUST BE OF SUCH QUALITY TO BE ACCEPTABLE TO GEOLOGISTS EXPERIENCED IN IDENTIFYING AND EVALUATING SEISMIC ACTIVITY
MUST SHOW EITHER
NO FAULTS WHICH HAVE HAD DISPLACEMENT IN HOLOCENE TIME ARE PRESENT
OR
NO LINEATIONS SUGGESTING PRESENCE OF FAULT (WITH DISPLACEMENT IN THE HOLOCENE TIME) WITHIN 3,000 FEET OF THE FACILITY ARE PRESENT
USING DATA FROM
a) PUBLISHED GEOLOGICAL STUDIES
b) AERIAL RECONNAISSANCE OF THE AREA WITHIN 5-MILE RADIUS OF FACILITY
c) ANALYSIS OF AERIAL PHOTOS COVERING 3,000 FT. RADIUS OF FACILITY
d) RECONNAISSANCE BASED ON SITE WALKING TOUR WITHIN 3,000 FT. OF FACILITY, IF NEEDED TO CLARIFY ABOVE DATA
FAULTS (INCLUDING LINEATIONS) WHICH HAVE HAD DISPLACEMENT IN HOLOCENE TIME ARE PRESENT WITHIN 3,000 FT. OF A FACILITY, BUT DO NOT PASS WITHIN 200 FT. OF THE PORTIONS OF THE FACILITY WHERE TREATMENT, STORAGE, OR DISPOSAL OF HAZARDOUS WASTES WILL BE CONDUCTED.
BASED ON
COMPREHENSIVE GEOLOGIC ANALYSIS OF THE SITE WHICH IS CONCLUSIVE CONCERNING ABSENCE OF FAULTS WITHIN 200 FT. OF SUCH PORTIONS OF THE FACILITY
IF DATA FROM SUCH AN ANALYSIS IS INCONCLUSIVE IN THIS AREA, DATA SHALL BE OBTAINED FROM SUBSURFACE EXPLORATION (TRENCHING) OF THE AREA WITHIN A DISTANCE NO LESS THAN 200 FT. FROM SUCH PORTIONS OF A FACILITY. TRENCHING SHALL BE PERFORMED IN A DIRECTION THAT IS PERPENDICULAR TO KNOWN FAULTS (DISPLACEMENT IN HOLOCENE TIME) PASSING WITHIN 3,000 FT. OF THE PORTIONS OF THE FACILITY DISCUSSED. THIS INVESTIGATION WILL DOCUMENT LOCATION OF ANY FAULTS FOUND WITH SUPPORTING MAPS AND OTHER ANALYSIS.

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Figure 5-3. Seismic standard requirements.

TABLE 5-23. APPENDIX VI POLITICAL JURISDICTIONS

Political Jurisdictions in Which Compliance
With §264.18(a) Must Be Demonstrated

Alaska

Aleutian Islands
Anchorage
Bethel
Bristol Bay
Cordova-Valdez
Fairbanks-Fort Yukon
Juneau
Kenai-Cook Inlet
Ketchikan Prince of Wales
Kodiak
Lynn Canal-Icy Straits
Palmer-Wasilla-Talkeena
Seward
Sitka
Wade Hampton
Wrangeli Petersburg
Yukon-Kuskokwim

Arizona

Cochise
Graham
Greenlee
Yuma

California

All

Colorado

Archuleta
Conejos
Hinsdale
Mineral
Rio Grande
Saguache

Hawaii

Hawaii

Idaho

Bannock
Bear Lake
Bingham
Bonneville
Caribou
Cassia
Clark
Franklin
Fremont
Jefferson
Madison
Oneida
Power
Teton

Montana

Beaverhead
Broadwater
Flathead
Gallatin
Granite
Jefferson
Lake
Lewis and Clark
Madison
Meagher
Missoula
Cascade
Deer Lodge
Park
Powell
Sanders
Silver Bow
Stillwater
Sweet Grass
Teton
Wheatland

(continued)

TABLE 5-23 (continued)

Nevada

All

New Mexico

Bernalillo
Catron
Grant
Hidalgo
Los Alamos
Rio Arriba
Sandoval
Santa Fe
Sierra
Socorro
Taos
Torrance
Valencia

Utah

Beaver
Box Elder
Cache
Carbon
Davis
Duchesne
Emery
Garfield
Iron
Juab
Millard
Morgan
Piute
Rich
Salt Lake
Sanpete
Sevier
Summit
Tooele
Utah
Wasatch
Washington
Wayne
Weber

Washington

Chelan
Clallam
Clark
Cowlitz
Douglas
Ferry
Grant
Grays Harbor
Jefferson
King
Kitsap
Kittitas
Lewis
Mason
Okanogan
Pacific
Pierce
San Juan Islands
Skagit
Skamania
Snohomish
Thurston
Wahkiakum
Whatcom
Yakima

Wyoming

Fremont
Lincoln
Park
Sublette
Teton
Uinta
Yellowstone National Park

Although specific procedures for conducting appropriate field investigations are not provided in the regulations, all permitting decisions (waivers, monitoring programs) are based on such data. The applicant's objective in such an investigation is to obtain the information necessary to allow the permit writer to evaluate with confidence that the site is not within 3,000 feet of a fault. Information presented by the applicant must be of a quality acceptable to geologists experienced in identifying and evaluating seismic activity.

In the case of §270.14(b)(11)(ii)(A), an applicant must show that no faults (or lineations suggesting faults) which have had displacement in Holocene time are present within 3,000 feet of the facility. The applicant should base this decision on some or all of the following data sources:

- published geologic studies
- walking reconnaissance of the area (3,000 feet)
- aerial reconnaissance of the area (5-mile radius)
- analysis of aerial photos (3,000 foot radius).

Published geologic studies are available through both federal and state agencies (the U.S. Geological Society, State Geological Survey Offices, the U.S. Soil Conservation Service, etc.). A listing of the addresses of some of these agencies is included in Appendix C of this manual. In addition, the Nuclear Regulatory Commission thoroughly researches the geology around proposed nuclear sites, thus they might be a source of information. Since a variety of site related data are required to fulfill permit application requirements (topography, soils, bedrock and surficial geology, ground water, surface water, etc.) it is recommended that all available information be thoroughly researched. Publications, maps, and computerized data bases are all useful. In some cases, additional information such as ground-penetrating radar or seismic refraction surveys may also be available. Local agencies and professional literature should also be consulted. Any deficiencies in data should be noted. The data should be reviewed and summarized by a qualified geologist who is familiar with local conditions.

If local conditions are relatively unknown, a walking reconnaissance is recommended. This walking tour would ideally be designed to tie in other parameters necessary to complete the application. For example, snapshots could be obtained, sketches of the area could be drawn for use in compiling the site map, seismic study areas and flood control measures could be considered, soil samples could be procured, etc. The people participating in the site tour should include those whose expert opinions will be used in evaluating the site; i.e., a geologist, engineer, aerial photograph interpreter, etc.

If existing aerial photographs are available, they may be used as an additional source of information. Virtually, all of the U.S. has been photographed in recent years for various federal agencies and a map has been compiled indicating areas photographed.[2] This map is available free of charge from the:

U.S. Geologic Survey
Washington, D.C. 20242

The map shows all areas of the U.S., by county, which have been photographed by Federal agencies. Names and addresses of the agencies holding the negatives for photographs are printed on the back of the map. Stereographic coverage should be requested. Other potential sources of aerial photos are listed in Appendix D of this manual. Aerial photos will vary in quality with season of flight, film type, photo scale, cloud cover, and other factors. You should determine what photos are available for the site area and procure them if they would aid in determining the presence of faults.

Air photo interpretation requires experience. Diagnostic features include terrain position, color tones, topography, drainage and erosional features, and vegetative cover. Scale should be 1:20,000 for geologic interpretation of surface materials, in some instances deep, underground conditions can also be predicted given sharp photography. Onsight follow-up to aerial interpretations (walking reconnaissance) is recommended to validate results. Features such as sink holes, which must be investigated as part of foundation analysis, can also be noted using aerials.

If available photos, having been reviewed by one experienced in aerial photo interpretation techniques, show conclusively that no faults are present, the applicant should submit those photos to meet the requirements of §270.14(b)(11)(ii)(A). If instead, there is doubt as to their clarity in indicating lineations or faults for some reason (quality of photo, time of year, etc.) or if they do not adequately cover the area in question (within a 5-mile radius and covering a 3,000 foot radius about the facility) the applicant might consider an aerial reconnaissance flight. Information for planning such a flight is presented as Appendix E to this manual.

Example:

> "No faults having had displacement in Holocene time are present at our site which is located in Long Beach, California. We consulted the regional USGS Office for ground-penetrating radar or seismic refraction surveys in the area and procured a ground-penetrating radar survey which ran inside the site boundary. Topographic and geologic (surficial and bedrock) maps were obtained. Holocene fault maps of the area were also procured, as they have been compiled under the California Geologic Hazards Act. The maps were searched for faults, including fault traces, fault planes, faults which did not have surface expression, main faults, branch faults, and secondary faults. Aerial photographs were obtained from the Soil Conservation Service which covered a 5-mile radius of the area, and the area within a 3,000 foot radius was analyzed by our geologist, who is also skilled in interpretation of aerial photographs.

In reviewing the aerial photos, the interpreter searched for indicators of faults, such as alignments of stream segments and small drainage courses. As most high-angle faults are expressed on photographs as straight or gently curving lines (this characteristic is probably the most important clue that a fault may exist), all linear features were examined carefully.[3] In one area, a shadow had been cast on the photos. This area was walked by our experienced geologist, our engineers, and others who had a part in site evaluation. No evidence of lineations or faults having displacement during Holocene time was found."

If your analysis of the four data sources indicates that there are no faults within 3,000 feet of the proposed facility, then you must document that fact in your permit application and you will have shown compliance with the seismic standard in §264.18(a). It may not be necessary to submit copies of all the supporting data. The agency may simply accept the signed statements of the geologist, photo interpreter, etc. In any case, you should include a detailed list of all the materials you reviewed and investigated to support your statement on the absence of faults.

In the event that your investigation does identify a fault within 3,000 feet of your facility, the information you submit must make the showing indicated in §270.14(b)(11)(ii)(B).

The objective is to provide EPA with suitable information to show that no faults (or lineations) pass within 200 feet of the portions of the facility where treatment, storage, or disposal of hazardous waste will be conducted. This should be based on data from a comprehensive geologic analysis of the site. This analysis can serve many purposes in that other sections of the application require similiar data. A comprehensive geologic analysis would use any or all of the following tools:

- surface geophysical surveying
- drilling and logging of boreholes
- other methods

Seismic Surveys can be used to show where faults or lineations run and to estimate elevations and thickness of hydrogeologic units. For the analysis required, ground-penetrating radar and possibly seismic refraction methods could be utilized. Less definitive seismic tools for fault-detection include microgravimetry and magnetic surveys. Reflection seismograph surveys may show faults by a zone of no reflection but provide no definite basis for determining direction of fault placement; a gravity survey complementary to this can locate the corresponding fault indications and show direction of displacement. Drilling and borehole logging can improve estimates of contact elevations. To verify seismic data, some sort of digging is often required, such as logging or trenching (subsurface exploration).

Aspects of seismic surveys are explained in the following references:[4]

- For general field investigations including geologic mapping, and evaluations of borings and trenches - Earth Manual, U.S. Dept. of Interior, U.S. Government Printing Office, Washington, D.C. 1974;

- For surface geophysical methods - Zohdy et al., "Application of Surface Geophysics to Groundwater Investigations," U.S. Geological Survey Techniques of Water Resources Investigations Book 2, Chapter D.1, 1974; Roux "Electrical Resistivity Evaluations at Solid Waste Disposal Facilities" U.S. EPA SW-729, 1978; Telford et al., Applied Geophysics, Cambridge University Press, Cambridge, 1977; Dobrin, Introduction to Geophysical Prospecting, McGraw-Hill, Inc., New York, 1976; L. L. Nettleton, Monograph Series No. 1, Elementary Gravity and Magnetics for Geologists and Seismologists, 1971; Paul M. Tucker and Howard J. Yorston, Monograph Series No. 2, Pitfalls in Seismic Interpreation, 1973;

- For borehole geophysical methods - Keys and MacCary, "Application of Borehole Geophysics to Water Resources Investigations; U.S. Geological Survey Techniques of Water Resources Investigations, Book 2, Chapter E1, 1971.

The Earth Manual, Zohdy et al. (1974), and Keys and MacCary (1971) are available through the U.S. Government Printing Office (see Appendix A).

If the comprehensive geologic analysis does not provide conclusive evidence that faults are absent within 200 feet of the portions of the facility, where treatment, storage, or disposal of hazardous waste will be conducted, the regulations require the applicant to perform subsurface exploration (trenching) of the area within a distance no less than 200 feet from such portions of the facility. This trenching must be performed in a direction that is perpendicular to known faults (which have had displacement in Holocene time) passing within 3,000 feet of such portions of the facility. Supporting maps and other analyses must document the location of any faults found and these must be submitted as part of the permit application. Excavations such as this, to more accurately define shallow subsurface conditions, may also be tied in to permit requirements such as a liner foundation analysis (if a liner is to be used) or other test pits and trenches.

Example 1:

> "We conducted a geologic analysis to augment information from aerial photographs which had indicated a lineation approximately 1,000 feet from the proposed facility location. This was followed by an onsite reconnaissance of the area for clarification. The walking tour indicated that, in fact, more information would be necessary to determine if the fault intersected the proposed facility area. Using ground penetrating radar, the fault was shown to lie outside of a 200 foot radius of the facility. Maps and data from the survey along with our geologist's interpretation are included with this submittal."

Example 2:

"In carrying out the geologic analysis of this site, two faults were investigated. One, termed the main fault as it showed greatest displacement, length and continuity, was located approximately 1,500 feet from the site. Diverging from this fault and extending well beyond the main fault was a branch fault which ran to a point only 180 feet from one portion of the facility as designed. It was decided that a trenching operation was necessary to further define the extent of the branch fault, and a back hoe was used to trench perpendicular to the fault in this area. Based on the results of this trenching, we re-designed the facility to locate storage tank F at a distance of 400 feet from the branch fault. We are submitting the following with this application: detailed engineering drawings of the trenches; surficial and bedrock geology maps of the site compiled by a local geologist; and a seismic analysis of the site using ground-penetrating radar."

List of Major Points

1. Under what political jurisdiction does the proposed location fall?

2. Is this county, township, etc. listed in Appendix VI?

3. Is published geologic data available for this site? What other data can be obtained from the sources used?

4. If published data is not available or inadequate, what type of field investigations are needed to secure adequate information? Can these be tied into the other requirements within this application?

5. Is a site walking reconnaissance of the site necessary to clarify the seismic data? Who should participate in such a tour? What other data can be collected during the tour?

6. Do aerial photographs exist for the area, and if so, were they taken (at the correct season of the year, on a useful type of film, from a low enough altitude, such that they show the entire site area etc.) such that they are useful in interpretation of faults (lineations)? If not, is an aerial reconnaissance flight a viable option?

7. Who will interpret the photos, once obtained?

8. If the aerials show faults to be present within 3,000 feet of the site, can a comprehensive geologic analysis of the site provide ample evidence to indicate that no fault or lineation displaced in Holocene time runs within a 200 foot radius of the portions of the site where hazardous waste will be treated, stored, or disposed of?

9. What data will be submitted to support this application?

10. If this information cannot show conclusively that no fault is present within this 200 foot radius and therefore trenching is necessary to provide more evidence, what trenching data (maps, analyses, etc.) can be used to show that faults are not present in the 200 foot range?

11. Has a geologist familiar with the local situation been involved in this investigation? Would the data be acceptable to geologists experienced in identifying and evaluating seismic activity?

Additional discussion on the seismic considerations can be found in the preamble to the regulations located at 46 FR 2810 in the January 12, 1981 issue of the Federal Register. Applicants should also consult the EPA Background Document "Standards Applicable to Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities under RCRA, Subtitle C, Section 3004. General Facility Standards for Location of Facilities (40 CFR 264, Subpart B, Section 264.18)." U.S. EPA, December 30, 1980.

5.11.2.2 Floodplains--

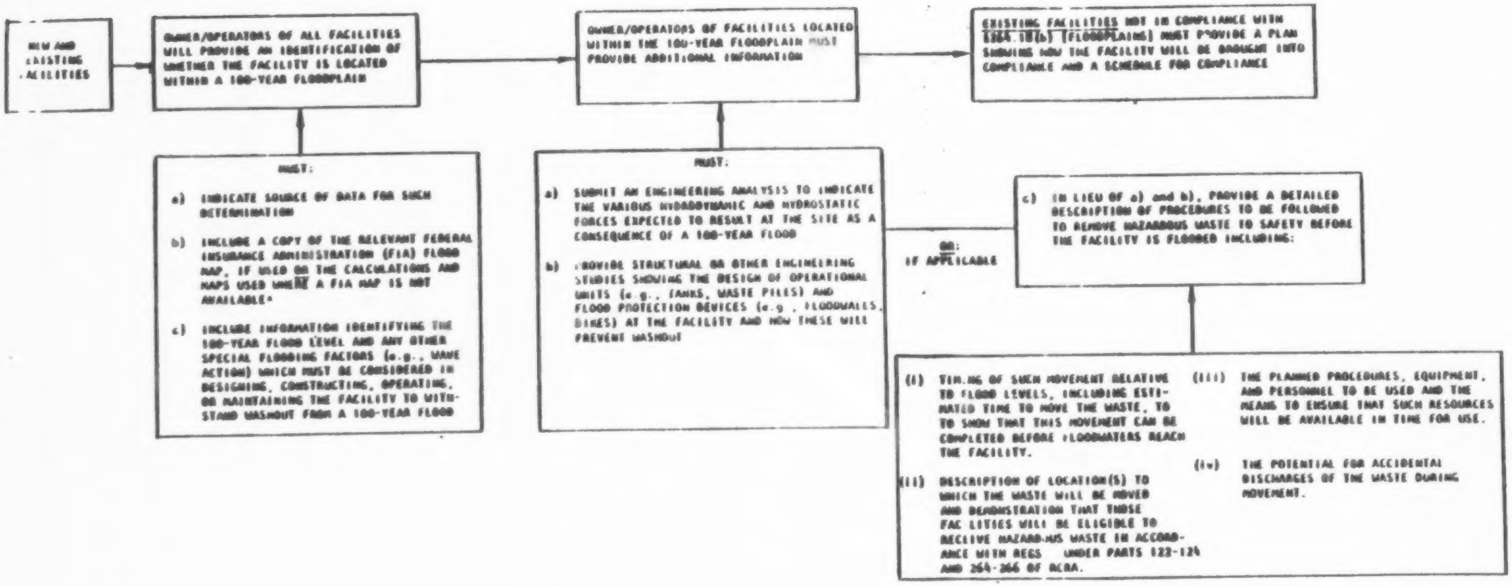
Purpose--The intent of the regulation is to prevent the release of hazardous wastes from a facility during a flood. In general, the EPA feels that waste management facilities should not be located where a flood may occur. However, in some circumstances, it may be necessary to locate a new waste management facility in a floodplain and, in fact, some existing facilities are so located. Thus, the informational and regulatory requirements of §270.14(b)(11)(ii),(iv),(v) and §264.18(b) have been established to minimize the potential for hazardous waste release in the event of a flood; they apply to both new and existing facilities. Existing facilities not in compliance with the floodplain standard must provide a plan showing how they will be brought into compliance and a compliance schedule. Figure 5-4 is a flow diagram which summarizes the floodplain information required to meet the standard in §264.18(b).

The standards in §264.18(b)(1) specify the design, construction, and operating requirements for facilities located in a 100-year floodplain. Definitions are provided in §264.18(b)(2) that should be noted including:

- 100 year floodplain: any land area which is subject to a 1 percent or greater chance of flooding in any given year from any source.
- 100 year flood: a flood that has a 1 percent chance of being equaled or exceeded in any given year.
- Flood prone is defined here as any land area susceptible to being inundated by water from any source.[5]

The first step in showing compliance is documentation of whether the facility is located within a 100-year floodplain. Relevant information that must be provided in the application should include:

- the source of data used for this determination.



NEW AND EXISTING FACILITIES

OWNER/OPERATORS OF ALL FACILITIES WILL PROVIDE AN IDENTIFICATION OF WHETHER THE FACILITY IS LOCATED WITHIN A 100-YEAR FLOODPLAIN

MUST:

a) INDICATE SOURCE OF DATA FOR SUCH DETERMINATION

b) INCLUDE A COPY OF THE RELEVANT FEDERAL INSURANCE ADMINISTRATION (FIA) FLOOD MAP, IF USED OR THE CALCULATIONS AND MAPS USED WHERE A FIA MAP IS NOT AVAILABLE*

c) INCLUDE INFORMATION IDENTIFYING THE 100-YEAR FLOOD LEVEL AND ANY OTHER SPECIAL FLOODING FACTORS (e.g., WAVE ACTION) WHICH MUST BE CONSIDERED IN DESIGNING, CONSTRUCTING, OPERATING, OR MAINTAINING THE FACILITY TO WITHSTAND WASHOUT FROM A 100-YEAR FLOOD

OWNER/OPERATORS OF FACILITIES LOCATED WITHIN THE 100-YEAR FLOODPLAIN MUST PROVIDE ADDITIONAL INFORMATION

MUST:

a) SUBMIT AN ENGINEERING ANALYSIS TO INDICATE THE VARIOUS HYDRODYNAMIC AND HYDROSTATIC FORCES EXPECTED TO RESULT AT THE SITE AS A CONSEQUENCE OF A 100-YEAR FLOOD

b) PROVIDE STRUCTURAL OR OTHER ENGINEERING STUDIES SHOWING THE DESIGN OF OPERATIONAL UNITS (e.g., TANKS, WASTE PILES) AND FLOOD PROTECTION DEVICES (e.g., FLOODWALLS, DIKES) AT THE FACILITY AND HOW THESE WILL PREVENT WASHOUT

OR:
IF APPLICABLE

c) IN LIEU OF a) and b), PROVIDE A DETAILED DESCRIPTION OF PROCEDURES TO BE FOLLOWED TO REMOVE HAZARDOUS WASTE TO SAFETY BEFORE THE FACILITY IS FLOODED INCLUDING:

(i) TIMING OF SUCH MOVEMENT RELATIVE TO FLOOD LEVELS, INCLUDING ESTIMATED TIME TO MOVE THE WASTE, TO TO SHOW THAT THIS MOVEMENT CAN BE COMPLETED BEFORE FLOODWATERS REACH THE FACILITY.

(ii) DESCRIPTION OF LOCATION(S) TO WHICH THE WASTE WILL BE MOVED AND DEMONSTRATION THAT THOSE FACILITIES WILL BE ELIGIBLE TO RECEIVE HAZARDOUS WASTE IN ACCORDANCE WITH REGS UNDER PARTS 122-124 AND 264-266 OF RCRA.

(iii) THE PLANNED PROCEDURES, EQUIPMENT, AND PERSONNEL TO BE USED AND THE MEANS TO ENSURE THAT SUCH RESOURCES WILL BE AVAILABLE IN TIME FOR USE.

(iv) THE POTENTIAL FOR ACCIDENTAL DISCHARGES OF THE WASTE DURING MOVEMENT.

EXISTING FACILITIES NOT IN COMPLIANCE WITH §264.18(b) (FLOODPLAINS) MUST PROVIDE A PLAN SHOWING HOW THE FACILITY WILL BE BROUGHT INTO COMPLIANCE AND A SCHEDULE FOR COMPLIANCE

*WHERE FIA MAPS ARE AVAILABLE, THEY WILL NORMALLY INDICATE WHETHER A FACILITY IS LOCATED WITHIN OR OUTSIDE OF THE 100-YEAR FLOODPLAIN. WHERE THE FIA MAP EXCLUDES AN AREA (USUALLY AREAS OF THE FLOODPLAIN <200' IN WIDTH), THESE AREAS MUST BE CONSIDERED AND A DETERMINATION MADE AS TO WHETHER THEY ARE IN THE 100-YEAR FLOODPLAIN. WHERE FIA MAPS ARE NOT AVAILABLE, EQUIVALENT MAPPING TECHNIQUES MUST BE USED BY THE OWNER/OPERATOR TO DETERMINE WHETHER THE FACILITY IS WITHIN THE 100-YEAR FLOODPLAIN, AND IF SO LOCATED, WHAT THE 100-YEAR FLOOD ELEVATION WOULD BE.

Figure 5-4. Floodplain location requirements.

- an original or clear copy of the relevant Federal Insurance Administration (FIA) flood map or calculations and maps used where an FIA map is not available.

- clear identification of the 100-year flood level and any other special flooding factors (e.g. wave action) which must be considered in designing, constructing, operating or maintaining the facility to withstand washout from a 100-year flood.

As a part of the National Flood Insurance Program (NFIP), Flood Hazard Boundary Maps (FHBM) have been prepared for virtually all 20,238 communities that have been identified as "flood prone".[1] The FHMB delineates the boundaries of the 100-year floodplain, but elevations are not provided. Nearly 90 percent of the Federal Emergency Management Agency (FEMA) maps are FHBMs. In addition, some of the communities that have been accepted into the NFIP have Flood Insurance Rate Maps (FIRM) which delineate the 100-year floodplain and also provide flood elevations.[1] Where these maps are available, the determination as to location on a 100-year floodplain is straight-forward. Such maps are most often included as part of a brief Flood Insurance Study for a particular political jurisdiction along a waterway. The U.S. Department of Housing and Urban Development, Federal Insurance Administration which publishes such studies, includes a fold-out map delineating 100-year flood boundaries for various river reaches in the area covered. Examples provided in this section refer to such a map and a representative drawing of one may be found in Figure 5-5 which appears later. In addition, parameters such as hydraulic analyses used to determine the flood level, community description, and principal flood problems and flood protection measures are provided in such flood insurance studies.

If a 100-year flood level is not available from another source, it can be determined using a FHBM. A qualified hydrologist will be able to make such a determination in less than a day's work or FIA may be contacted to assist in determining the 100-year flood elevation at a particular location.[1] FIA, however, does not usually map floodplains that are less than 200 feet wide; therefore, it is unlikely that mapped information exists for such areas. Where FIA omits an area due to this 200 foot exclusion, the owner or operator will have to make a determination as to the extent of the 100-year floodplain. FIA mapping procedures or equivalent mapping techniques should be used to make this determination, and to determine what the 100-year flood elevation would be.[1] You should note that floodplains less than 200 feet wide are frequently subject to local zoning ordinances and easements.

Other sources of floodplain maps and additional information may also be consulted, such as the U.S. Geological Survey, the U.S. Army Corps of Engineers, the U.S. Soil Conservation Service, and the Office of Coastal Zone Management. The Army Corps of Engineers has issued technical manuals on design and construction techniques and methods for ascertaining the proper levels of structural integrity for flood protection devices such as dikes, covers, and flood walls. For example, the general manual entitled "Flood-Proofing Regulations" will be of use to the applicant (EP 1165-2-314, June 1972). There is also an Engineering Manual by the Army Corps of

Engineers (EM 1110-2-1913) for design and construction of levees (1978). The Department of the Army also published "Wall Design: Floodwalls" in 1948 which was due to be revised by 1981. The U.S. Bureau of Reclamation published a manual for design of small dams in 1973. In addition, the Nuclear Regulatory Commission has thoroughly researched the manner in which one protects elements of a nuclear facility from the hazards of flooding. Those techniques could also be applied in hazardous waste facility protection.[1]

Example 1: Flood Insurance Study Available

"The facility is proposed to be located in the Borough of Trainer, Pennsylvania, near Marcus Hook Creek, which is a tributary to the Delaware River. Facility plans call for use of land near the Smith Street area, as shown in Figure 5-5. The Flood Insurance Study for Trainer Borough has been obtained through the Federal Emergency Management Agency (FEMA), Region III, Philadelphia, PA, and is submitted as part of this application. The location of the facility is within the 100-year floodplain as indicated on the map provided by FEMA (see Figure 5-5). That map is included in this application. The flood elevation is approximately 12.25 feet msl (provided on map). Special flooding factors applicable in this area were researched; wave action is not deemed to be a significant problem on the creek. Potential sources which could influence flooding, located upstream of the site, are enumerated and plans for dealing with flooding are included in this application."

Example 2: Site Near Water Body--No Flood Insurance StudyAvailable Use Hydrologist and Computer Modeling

"The proposed facility will be built near a water body for which no Federal Flood Insurance Study has been carried out. A map of the area is included in this submittal showing the potential 100-year flood elevation as determined by a hydrologist. Water surface elevation for the 100-year flood was computed using the U.S. Army Corps of Engineers HEC-2 step-back water computer program (U.S. Army Corps of Engineers, Hydrologic Engineering Center, October 1973, HEC-2 Water Surface Profile Users Manual 723-02A, Davis, CA).[6] The map included in this submittal delineates the 100-year flood elevation predicted by the model as well as the proposed facility location and indicates that the facility will not be located in this floodplain."

Example 3: Site Near Small Creek--No FIA Study Available--Request Aid

"The site location is near a small creek which is excluded from FIA maps due to the fact that the floodplain is less than 200 feet in width. We requested aid from the FIA to help designate the 100-year floodplain and associated elevation for this area. The resultant map is part of this application and indicates that the site is not within the 100-year floodplain boundary."

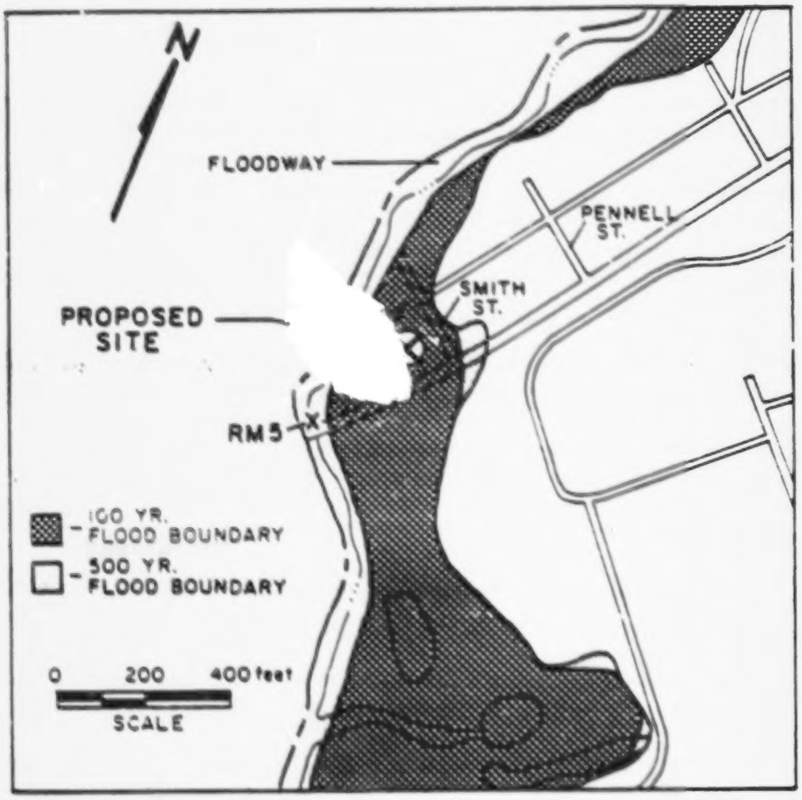


Figure 5-5. Site located on 100-year floodplain.
Source: Reference 6.

Example 4: Site Near Water Body--No FIA Study Available--Obtain Gaging Records

> "Records from a nearby gaging station were obtained from the USGS covering the past 50 years. Combining these flood records with climatological data from the National Weather Service an elevation for a 100-year flood was determined. Drum storage onsite was designed such that it was located at the highest point onsite, 25 feet above the estimated 100-year flood evaluation."

If the preceding investigation reveals that your facility is not in the 100-year floodplain, submittal of the documentation is compliance. If, however, your facility is located in the 100-year floodplain, then the regulations require that a facility in a 100-year floodplain be designed, constructed, operated and maintained to prevent washout, unless you can demonstrate that if washout occurs, no adverse effects on human health or the environment will result. To demonstrate this, regulations stipulate that you must either:

- Provide for the safe removal of waste (to a non-vulnerable location, as specified) before the flood waters reach the site, OR,
- Owners of existing surface impoundments, waste piles, land treatment units, and landfills may choose to demonstrate that no adverse human health effects or environmental effects will result if washout occurs based on:
    - the volume and physical and chemical characteristics of the waste in the facility;
    - the concentration of hazardous constituents that would potentially affect surface waters as a result of washout;
    - the impact of such concentrations on the current or potential uses of the affected surface waters, including demonstration of compliance with established water quality standards; and
    - the impact of hazardous constituents on the sediment of affected surface waters or the soils of the 100-year floodplain that could result from washout.

All applicants who do not make a "no adverse affects" showing must provide information regarding either the procedures that will be relied upon to insure flood protection or the methods that will be used to remove wastes to safety in the event of flooding. Flood protection refers to any method which prevents flood waters from reaching the facility or active portions thereof, such as building a sufficiently high berm around a waste pile or a landfill, or designing a levee such that it is built at the height of the 100-year flood plus a 3-foot safety factor. Flood proofing measures, on the other hand, allow flood waters to come into contact with structures as long as structural damage is prevented. For example, elevating a tank such that flood waters in a 100-year flood would be likely to make contact with the tank's support structure, but not overtop the tank itself, or use of impermeable walls for structures, or proper anchoring of containers. Flood protection measures may also be needed at a flood proofed facility if waste will be exposed at the 100-year flood level (i.e., an uncovered tank).[1] Any permit applicant who decides to demonstrate that a facility is protected against hazardous waste release if flooded must provide both an engineering analysis that indicates the various hydrodynamic and hydrostatic forces expected at the site as a consequence of a 100-year flood, and structural or other engineering studies showing the design of operational units (e.g., tanks) and flood protection devices (e.g., floodwalls, dikes) at the facility and how these will prevent washout.

Alternatively, any applicant seeking a permit for a facility that is located in a 100-year floodplain has the option of removing waste from a flood prone area in the event of flooding. In these cases, the applicants should describe a justifiable plan which details the procedures to be followed to remove hazardous waste to safety before the facility is flooded. The information which is required is presented in §270.14(b)(11)(C) and includes:

- An indication of the timing of waste movement relative to flood levels, including estimated time to move all the waste. You must show that such movement can be completed before floodwaters reach the facility.

- A description of the location(s) to which the waste will be moved. You must demonstrate that this facility is either permitted by EPA under 40 CFR Part 264, authorized to manage hazardous waste by a state with a hazardous waste management program authorized under Part 123 of 40 CFR or in interim status under Part 265 of 40 CFR.

- An explanation of the planned procedures, equipment, and personnel to be used and the means you will employ to ensure that such resources will be available in time for use.

- A determination and description of the potential for accidental discharges of the waste during movement.

Requirements pertaining to other Federal laws (the Wild and Scenic Rivers Act, the National Historic Preservation Act, the Endangered Species Act, the Coastal Zone Management Act, the Fish and Wildlife Coordination Act, and other Executive Orders) which affect the location and permitting of facilities may be found in §122.12. EPA also has a manual for Special Environmental Area (SEA) requirements for hazardous waste facility permits that provides details relative to these laws. Applicants are encouraged to consider the requirements of these other laws when planning a facility location to prevent possible permit delays.

Example 1: Proposed Land Treatment Facility--Flood Protection

"The land treatment facility is proposed to be located on the 100-year floodplain. As the facility is to be used for land treatment, the appropriate methodology for prevention of washout of wastes requires flood protection, i.e., not allowing flood waters to reach the facility or active portions thereof. Design plans include construction of a levee around the facility which is sufficiently high to protect against washout of wastes. This was determined by designing the levee to be the elevation of the 100-year flood plus a safety factor of 3 feet. Prior to placement of the levee, the ground surface will be cleared and grubbed such that the formation of voids where humus has decomposed (and hence form internal drainage networks which might undetermine the structural integrity of the levee) will be unlikely.[1] The Army Corps of Engineers "Engineering Manual for Design and Construction of Levees" was followed. In addition, the entire building that stores wastes before application to the land will conform to FIA minimum requirements in that the lowest floor will be built at an elevation equal to the level of the 100-year flood elevation. An engineering analysis which indicates the various hydrodynamic and hydrostatic forces expected to result from the 100-year flood and measures taken to design the facility accordingly is also included."

Example 2: Proposed Drum Storage--Flood-Proofing

"The facility is located on the 100-year floodplain. Flood-proofing measures are described in detail; they allow flood waters to come into contact with the building structures while preventing damage thereof. The Army Corps of Engineers manual "Flood-Proofing Regulations" was rigorously followed. The floodproofing follows FIA's minimum requirements. The building housing the drums will be floodproofed such that below the 100-year flood level the structure is water tight with walls substantially impermeable to the passage of water. In addition, structural components will be capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.[1]"

Example 3: Proposed Drum Storage--Managerial Solutions

The site is located on a 100-year floodplain. Managerial procedures, as described, demonstrate that the drums are adequately safeguarded against washout without utilizing specific flood-proofing methods. The proposed site is designed to store up to 400 barrels of hazardous wastes we produce. Under normal circumstances, the barrels will be stored on pallets (four to a pallet) in Building D located at the most convenient access point to the site. However, as this point is also within the 100-year floodplain of a small stream, an attachment is provided to show plans which would guarantee safe storage of the drums in the event of the 100-year flood.

Forklift trucks will be used to transport the barrels from their present location to a concrete platform,* built 6 feet above the 100-year flood level on a hill onsite (approximately 500 feet away from Building D). Drums will be placed, at a maximum, two drums high, using the pallets for support. In most circumstances, however, we will be storing significantly fewer than 400 drums and stacking will not be necessary. Waste removal procedures are keyed to the river stages, such that, when the river approaches the 100-year flood stage, the contingency plan for drum relocation is initiated. Using four forklifts and a flat-bed truck we estimate that 400 drums can be moved in 3 hours and assure completion before floodwaters reach the facility.

The potential for accidental discharge of the waste during movement has been evaluated (damaging drums with the forklift, spilling drums, etc.) and necessary precautions are included as an attachment. Personnel who will be involved are trained and available at all times onsite. Methods to prevent any discharge are included in the application, including: health and safety precautions, drum removal stipulations, a mock demonstration of removal, personnel qualifications, and flat-bed truck and forklift maintenance."

Example 4: Existing Waste Pile

"Almost half of the facility property is located within the 100-year floodplain and is subject to floods 1-5 feet in depth. The long-term solution offered is to move the waste pile to higher ground; plans for such are attached. However, if a flood occurs prior to this, the following steps will be followed:

1. We will consult with the nearest National Weather Service station or the Army Corps of Engineers for a projected time and elevation of flood crest.

2. If this crest will result in less than 1 foot of water in the waste pile area, sandbags will be used to dike the area to a level of 1 foot over the projected level of water.

3. If the crest will be greater than 1 foot, the waste will be removed in a similiar manner to that described in "Managerial Solutions" of this section. The waste pile will take approximately 6 hours to remove; a sandbag dike will protect the site during this time."

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*Note: The applicant should recognize that the location to which the wastes will be moved must be a RCRA Interim Status Facility or a RCRA Permitted Facility.

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Example 5: New Landfill

"A permanent flood water protection dike will be constructed around three sides of the active landfill cells. A temporary flood water protection dike is to be constructed along the fourth side of the active landfill cells, to be moved as the landfill cells are expanded. When the maximum landfill cell size is reached, a permanent flood water protection dike will be constructed. The flood water protection dike will be constructed to a minimum elevation of thirteen feet above mean sea level, thus providing a factor of safety of 2 feet above the 100-year flood elevation. Additionally, side slopes will not exceed three horizontal to one vertical and will be protected from erosion due to incident rainfall, rainfall runoff, or flooding. Attachments showing all engineering plans are included."

Example 6: Existing Landfill

"The landfill site is located on a 100-year floodplain. The volume and physical and chemical characteristics of the waste in the facility are reported as attachments to this application, as well as concentrations of hazardous constituents that could affect surface waters in a washout. Impacts of these constituents on users, water quality standards and sediments was evaluated by a toxicologist and are reported in the application. The facility is shown to be in compliance with existing standards."

Existing facilities that are located on a 100-year floodplain but do not have a flood plan or are not designed to withstand washout are not in compliance with the floodplain regulations in §264.18(b). These applicants are required by §270.14(b)(11)(v) to provide a plan indicating how and when the facility will be brought into compliance. A schedule supporting these assertions must be included.

Example:

"The facility was built in 1976. It is located on the 100-year floodplain and no flood protection or flood proofing measures exist; therefore, it is currently NOT in compliance with the regulations in §264.18(b). Under the interim RCRA permit for this facility, a compliance schedule was adopted which allows a one year time period during which levees will be built to bring the facility into compliance. Engineering plans of levee development are included in this application; they show the design of the operational units of the facility. Various hydrodynamic and hydrostatic forces expected during a 100-year flood are reported and features to protect the facility from damage due to such are enumerated."

List of Major Points

1. Is the area in question adjacent to any streams or rivers?

2. Are FIA flood hazard boundary maps/insurance studies available for the area in question? Are Flood Insurance Rate Maps available?

3. If not, are floodplain maps available from USGS or the Army Corps of Engineers or local planning agencies?

4. If the site is on a small floodplain area (200 feet wide), will the FIA help determine the 100-year flood elevation and areas affected? Can FIA techniques be used to calculate the elevation in-house?

5. What other tools can be used to indicate that the site is or is not located on a 100-year floodplain?

6. What special flooding factors should be considered in designing, constructing, operating, and maintaining the facility to withstand washout from a 100-year flood?

7. What hydrostatic and hydrodynamic forces are expected to result at the site as a consequence of a 100-year flood?

8. What type of control measure is warranted at the site: flood protection or flood proofing?

9. How are such units designed to show that washout will be prevented?

10. Is it practical to remove the waste to a safe location at the onset of flood conditions? How will such notification be assured? How will the removal take place? What equipment will be used? How is availability documented? How quickly can removal occur? What will be involved in the procedure, who will be responsible for what action, etc.? Where will the waste be moved to? Is this place eligible to receive hazardous waste in accordance with the regulations? What means are available to insure that the resources for such removal will be available in time for use? What is the potential for accidental discharge of waste to the environment during movement?

11. What are the volumes and physical and chemical characteristics of the waste?

12. What is the concentration of hazardous constituents that could affect surface waters during washout and what impact does this have on potential users of these waters and applicable water quality standards?

13. What is the impact on the sediments of these potentially affected surface waters or soils of the 100-year floodplain if there is a washout?

14. Is the facility in compliance with §264.18(b) (The Floodplain standards) i.e., is it designed, constructed, operated, and maintained to prevent washout of any hazardous waste during a 100-year flood?

15. If not, can it be demonstrated instead that the waste will be safely removed to a non-vulnerable location in case of flood?

16. If none of the above, can it be demonstrated that no adverse effects on human health or the environment will ensue due to washout (from a 100-year flood) from the facility? Consider volume and physical and chemical characteristics of the waste; concentration of wastes which could affect surface waters in a washout; impact on users, water quality standards, impact on soils, etc.

Additional discussion on the floodplain requirements can be found in the preambles to the regulations at 46 FR 2813 and 47 FR 32290 in the January 12, 1981 and July 26, 1982 Federal Registers, respectively. Also, applicants should review the EPA Standard for Location of Facilities described at the end of the seismic analysis Section, 5.11.2.1.

5.11.3 References

1. General Facility Standard for Location of Facilities (40 CFR 264, Subpart B, Section 264.18). Background Document. U.S. Environmental Protection Agency. December 30, 1980.

2. Avery, T. Eugene. Interpretation of Aerial Photographs. 2nd Edition. Burgess Publishing Company, Minneapolis, MN, 1968.

3. Ray, Richard G. Aerial Photographs in Geologic Interpretation and Mapping. Geological Survey Professional Paper 373; U.S. Government Printing Office, Washington, DC., 1960, p. 21.

4. Draft Permit Writers Manual for Subpart F.

5. U.S. Federal Emergency Agency, Federal Insurance Administration. "National Flood Insurance Program." §1909.1 Definitions. Federal Register. Vol. 41, No. 207. Tuesday, October 26, 1976.

6. U.S. Department of Housing and Urban Development, Federal Insurance Administration. Flood Insurance Study. Borough of Trainer, PA, Delaware County, September 1977.

5.12 PERSONNEL TRAINING

5.12.1 Regulatory Citations

Information on employee training must be submitted with Part B of the permit application, as specified in:

> "§270.14(b)(12) An outline of both the introductory and continuing training programs by owners or operators to prepare persons to operate or maintain the HWM facility in a safe manner as required to demonstrate compliance with §264.16. A brief demonstration of how training will be designed to meet actual job tasks in accordance with requirements in §264.16(a)(13)."

The regulatory requirements regarding employee training are contained in §264.16. They are:

> "§264.16 Personnel Training
>
> (a)(1) Facility personnel must successfully complete a program of classroom instruction or on-the-job training that teaches them to perform their duties in a way that ensures the facility's compliance with the requirements of this Part. The owner or operator must ensure that this program includes all the elements described in the document required under paragraph (d)(3) of this Section.
>
> (2) This program must be directed by a person trained in hazardous waste management procedures and must include instruction which teaches facility personnel hazardous waste management procedures (including contingency plan implementation) relevant to the positions in which they are employed.
>
> (3) At a minimum, the training program must be designed to ensure that facility personnel are able to respond effectively to emergencies by familiarizing them with emergency procedures, emergency equipment, and emergency systems, including, where applicable:
>
> (i) Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment;
>
> (ii) Key parameters for automatic waste feed cut-off systems;
>
> (iii) Communications or alarm systems;
>
> (iv) Response to fires or explosions;
>
> (v) Response to ground water contamination incidents; and
>
> (vi) Shutdown of operations.
>
> (b) Facility personnel must successfully complete the program required in paragraph (a) of this Section within six months after the effective date of these regulations or six months after the date of their employment or assignment to a facility or to a new position at a facility, whichever is later. Employees hired after the effective date of these regulations must not work in unsupervised positions until they have completed the training requirements of paragraph (a) of this Section.
>
> (c) Facility personnel must take part in an annual review of the initial training required in paragraph (a) of this Section.

(d) The owner or operator must maintain the following documents and records at the facility;

(1) The job title for each position at the facility related to hazardous waste management, and the name of the employee filing each job;

(2) A written job description for each position listed under paragraph (d)(1) of this Section. This description may be consistent in its degree of specificity with descriptions of other similar positions in the same company location or bargaining unit, but must include the requisite skill, education, or other qualifications, and duties of employees assigned to each position;

(3) A written description of the type and amount of both introductory and continuing training that will be given to each person filling a position listed under paragraph (d)(1) of this Section;

(4) Records that document that the training or job experience required under paragraphs (a), (b), and (c) of this Section has been given to, and completed by, facility personnel.

(e) Training records on current personnel must be kept until closure of the facility; training records on former employees must be kept for at least three years from the date the employee last worked at the facility. Personnel training records may accompany personnel transferred within the same company."

5.12.2 Guidance to Achieve the Part 264 Standards

5.12.2.1 General--

The intent of the personnel training requirements is to reduce the potential for mistakes which might threaten human health or the environment by insuring that facility personnel working in jobs where they handle hazardous waste will be thoroughly familiar with their duties and responsibilities. Further, the intent of the training requirements is not only to train personnel in the mechanics of their job function. Rather, and especially in the areas of safety and emergency response, employees should be made cognizant of why they must perform certain tasks in a prescribed manner. Providing employees with a thorough explanation of why certain operations are performed as they are, and not in a seemingly easier fashion, should reduce the use of "short-cut" procedures that may be dangerous to plant personnel or the surrounding population.

An outline of the training program for each of the job positions at your facility must be submitted with your Part B application. It should list the areas of concern which will be covered in both the initial training program and in the annual review program.

The point that you should make in your outline is that your programs will prepare your employees to operate and maintain the hazardous waste facility in a safe manner (as required to demonstrate compliance with §264.16).

You must also include a brief description of how your training programs will be designed to relate specifically to individual job tasks in familiarizing your employees with emergency procedures, emergency equipment, and emergency systems at your facility.

The requirements of §264.16 are that:

- Facility personnel must successfully complete a training program which ensures the facility's compliance with the requirements of this Part (§264.16(a)(1)).
- The training program must be directed by a person trained in hazardous waste management procedures (§264.16(a)(2)).
- The training program must be designed to ensure at a minimum that facility personnel are able to respond with familiarity during an emergency situation (§264.16(a)(3)).
- Facility personnel must successfully complete the program within six months of their assignment to a facility (§264.16(b)).
- Facility personnel must take part in an annual review of the training program (§264.16(c)).
- The owner/operator must maintain documentation at the facility (§264.16(d)).
- Training records on current personnel must be kept until closure of the facility (§264.16(e)).

"Facility Personnel," is defined in §260.10, as: "All persons who work at, or oversee the operations of a hazardous waste facility, and whose actions or failure to act may result in noncompliance with the requirements of Parts 264 or 265 of this Chapter." In other words, all personnel (supervisors and nonsupervisory personnel) who are actively engaged in the operation of the facility require the type of training which is described in this section of the manual.

5.12.2.2 Responsibility of Facility Personnel §264.16(a)(1)--

Under the guidelines of the regulation, all personnel associated with the handling of hazardous wastes are required to "successfully" complete a program of classroom instruction or on-the-job training that teaches them to perform their duties in a way that ensures the facility's compliance with the requirements of this part.

Training records for each employee must be maintained at your facility. However, these records and other paperwork required by §264.16 are not required to be submitted with Part B of your application. The only items in regard to personnel training that must accompany your application are an outline of introductory and continuing training programs and a brief description of how job tasks relate to the training. However, these items should be specific enough to demonstrate that your training program complies with the requirements of §264.16. Also note that §264.16 requires that detailed information and records regarding your training program must be made available at your facility.

It is required that the training programs be specific to the various positions performed at your facility. Training should be structured so that it parallels as realistically as possible the actual job in order that the "real world" activities are approximated as much as possible. Any training program must also take into account the educational level of the class.

Training may be acquired in any one of three ways: a formal training program (which refers to a training program offered outside of the facility such as the National Hazardous Materials Training Course offered by the Toxic Substances Control Laboratory of Vanderbilt University), in-house training programs, or on-the-job training programs. A combination of these three is also feasible. The decision lies with the owners and operators of the facility to determine which option is the most beneficial to operation of their facility.

It is not necessary for all facility personnel to be trained by attending a formal program. One approach would be to send only your supervisory personnel to formal, off-site training programs. In this way, they can acquire the appropriate training skills and then relay those skills to the remaining facility personnel by conducting more focused, on-the-job training sessions.

Choosing on-the-job or in-house training program options, as opposed to a formal training program, allows for more flexibility in your training programs. They can be designed to closely fit the individual needs of the employees' job requirements. A formal training program will be more general than a set of training programs designed for each of the positions at your facility, and thus may not cover all of the various job positions in the level of detail which is required by the regulation.

All facility personnel, regardless of their position, must be familiarized with your facility's contingency plan so they will all be able to respond effectively in an emergency situation (i.e., an evacuation due to the volatilization of spilled toxic wastes). In this case, the majority of employees will be responsible for vacating the premises in a predetermined manner, while other facility personnel (those who have been properly trained) will have higher levels of responsibility. Some may be responsible for containing the spill, informing local officials (i.e., police and firemen), or bringing out fire-fighting equipment.

5.12.2.3 Program Instructors §264.16(a)(2)--

The training program must be instructed by persons who are trained in hazardous waste management procedures and can familiarize facility personnel with those same management procedures. Facility personnel are only responsible for learning those procedures which are relevant to the positions in which they are employed.

Program instructors, especially those conducting formal programs, should preferably be experts in the field of hazardous waste management, since answers to questions that could arise during the class may require a background of considerable experience and expertise. For performance type training programs (on-the-job training), the instructor should be a supervisor who is skilled in the current methods of facility operation. Supervisors are recommended since they are the ones who must ultimately make the determination of whether or not the trainees have mastered the skills necessary to perform the tasks called for in their job descriptions.

5.12.2.4 Response to Emergencies §264.16(a)(3)--

At a minimum, your training program must familiarize facility personnel with emergency procedures, emergency equipment, and emergency systems which are applicable to their positions. Emergency response procedures which should be taught to selected facility personnel, as required by the regulations, are:

- Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment,
- key parameters for automatic waste feed cut-off systems,
- communications or alarm systems,
- response to fires or explosions,
- response to ground water contamination incidents, and
- shutdown of operations.

Additionally, employees who are in charge of managing wastes must have certain knowledge which will help them perform their jobs adequately. For example, their training program might include the following instructions;

- the chemical characteristics of the wastes which they are assigned to manage (i.e., reactivity and incompatibility with other types of wastes),
- knowledge of what to do in the event of a spill or leak,
- the types of protective equipment (such as respirators or self contained breathing equipment) or clothing to be worn,
- proper operation of trucks, forklifts, or any other machinery to be used in waste disposal,
- knowledge of basic first aid, and
- who to inform in the event of an emergency (such as the foreman).

It is your responsibility to define the scope of the training programs. The training programs should assure the Agency that your employees have or will have acquired the necessary training and management skills needed to perform their jobs in a competent manner that will protect human health and the environment. Thus, the more detailed the training program documentation, the more apparent it will be to the Agency that your facility is providing its personnel with proper training.

5.12.2.5 Time Requirements §264.16(b)--

To comply with the §264.16 regulations, the training program must be successfully completed by facility personnel at existing facilities within 6 months after the effective date of the regulations. Thus, you have 12 months from the promulgation date of the regulations (July 26, 1983) to make sure that your personnel have received their proper training.

New employees who are hired after the effective date of the regulations must not work in unsupervised positions requiring them to handle hazardous wastes until they have completed their training programs. New employees may handle hazardous wastes but only under the supervision of trained employees. It is beneficial to your facility to meet this requirement, as it will help avoid accidents and may help to keep insurance premiums at a minimum.

5.12.2.6 Annual Review §264.16(c)--

The emergency procedures taught in the original training program must be reviewed on an annual basis to keep personnel up to date with any changes, such as the characteristics of new wastes managed at your facility. With new and more sophisticated technologies being developed for hazardous waste, management facilities may have to periodically change certain procedures to remain current with these new technologies.

Also, due to changes in facility processes or emergency equipment, or with the types of wastes being accepted at your facility, your facility's contingency plan may need to be modified. Therefore, the contingency plan should also be included in the annual review process.

5.12.2.7 Recordkeeping §264.16(d)&(e)--

Records must be kept at your facility for examination by the Regional Administrator upon request. Maintenance of facility personnel training records acts as a certification program. The following must be included on your records:

(1) A job title for each position at your facility that is related to hazardous waste management (i.e., excluding clerical or janitorial positions) and the names of the employees filling those positions,

(2) a job description for each of those positions, and

(3) a description of the type and amount of introductory and continuing training that will be given to each employee.

The job description (for each position) must include:

- skill, education, or other qualifications needed by employees to fill each position at your facility,
- duties of employees assigned to each position.

It should not be too difficult to comply with the first or second recordkeeping requirements, since many facilities may have this information already in a written format. If not, job titles and job descriptions must be defined for each position.

The third recordkeeping requirement relates directly to the training program. For each job description, you must include the type of training to be given and the length of the program. For instance, if you are sending employees to a formal training program you must keep a written document stating the types of hazardous waste management practices being taught and the length of time involved.

Similarly, if you have designed your own training programs to be conducted in-house or on-the-job, you must keep a detailed written account of the material to be presented for each position. You must also include the techniques to be used and a schedule to be followed by the instructors. The training records must also contain the type and amount of training that will be given to fulfill the annual review requirement.

The records must be documented to prove that the proper training has been given to, and completed by facility personnel. Therefore, you must keep a record of the dates on which employees received their initial training and schedule the annual review.

The training records for current personnel must be kept on file at your facility until your facility closes. The training records of former employees must be kept for at least 3 years from their last date of employment at your facility. If a person is transferred within the same company, their training records remain the same.

The training records are needed by the Agency in order to judge whether facility personnel have to appropriate skills called for by their job descriptions and their specific duties in handling hazardous wastes. Thus, the more detail used in your training records, the more apparent it will be that your personnel are receiving the appropriate training.

5.12.3 List of Major Points

1. Has an outline of the training programs been included in the application?
2. Have both the original and annual training programs been addressed in the outline?

3. Has a description of how the training programs specific to the various job tasks performed at the facility been included with the outline?

4. Do the outline and descriptions of the training programs demonstrate that the facility personnel will acquire the ability to respond effectively to emergency situations which are related to their tasks and that they will be familiarized with the contingency plan?

5. Has documentation that the instructor is a person trained in hazardous waste management been included?

6. Has it been demonstrated that all employees will be trained within a 6-month time period from the date of their employment or transfer?

7. Have the training records for all facility personnel that will be maintained at the facility been described?

5.13 TOPOGRAPHIC MAP REQUIREMENTS

In fulfilling requirements set forth for Part B of the RCRA application, one of the first steps is to make or obtain a topographic map covering the area in question. Not only can this map serve as a base upon which information detailed in this section should be placed (legal boundaries, etc.); it also provides some of the required parameters intrinsically, for instance, USGS maps show contours, scale, date, etc. The requirements of §270.14(b)(19) are delineated here in conjunction with recommended methods for meeting these requirements. An example of a topographic map for a site is included to assist in the presentation.

5.13.1 Regulatory Citations

Part B of the permit application must incorporate a topographic map and associated information to meet the requirements of §260.14(b)(19), which are:

> "270.14(b)(19) A topographic map showing a distance of 1000 feet around the facility at a scale of 2.5 centimeters (1 inch) equal to not more than 61.0 meters (200 feet). Contours must be shown on the map. The contour interval must be sufficient to clearly show the pattern of surface water flow in the vicinity of and from each operational unit of the facility. For example, contours with an interval of 1.5 meters (5 feet), if relief is greater than 6.1 meters (20 feet), or an interval of 0.6 meters (2 feet), if relief is less than 6.1 meters (20 feet). Owners and operators of HWM facilities located in mountainous areas should use large contour intervals to adequately show topographic profiles of facilities. The map shall clearly show the following:
>
> (i) Map scale and date.
>
> (ii) 100-year floodplain area.
>
> (iii) Surface waters including intermittant streams.
>
> (iv) Surrounding land uses (residencial, commercial, agricultural, recreational).
>
> (v) A wind rose (i.e., prevailing wind-speed and direction).
>
> (vi) Orientation of the map (north arrow).
>
> (vii) Legal boundaries of the HWM facility site.
>
> (viii) Access control (fences, gates).
>
> (ix) Injection and withdrawal wells both onsite and offsite.
>
> (x) Buildings; treatment; storage, or disposal operations; or other structures (recreation areas, runoff control systems, access and internal roads, storm, sanitary, and process sewerage systems, loading and unloading areas, fire control facilities, etc.).
>
> (xi) Barriers for drainage or flood control.
>
> (xii) Location of operational units within the HWM facility site, where hazardous waste is (or will be) treated, stored, or disposed (include equipment cleanup areas).

Additional information which must be noted on the topographic map is specified in the requirements of §270.14(c)(3), as follows:

> "On the topographic map required under paragraph (b)(19) of this section, a delineation of the waste management area, the property boundary, the proposed "point of compliance" as defined under §264.95, the proposed location of ground water monitoring wells as required under §264.97, and, to the extent possible, the information required in paragraph (c)(2) of this section.", that being ...
> "(2) Identification of the uppermost aquifer and aquifers hydraulically interconnected beneath the facility property, including ground water flow direction and rate, and the basis for such identification (i.e., the information obtained from hydrogeologic investigations of the facility area)."

5.13.2 Obtaining Topographic Maps

The regulations require that the topographic map submitted in Part B of the application include: 2 feet or 5 feet contour intervals. USGS maps (7.5 minute quadrangles) generally incorporate 10 feet contour intervals so that the applicant may generally have to produce a map for his site. Some USGS maps for flat regions are at 5 feet intervals but will still likely be insufficient due to the range of elevation (little) incurred in such an area (with flat areas, the intent is to provide 2 feet contour intervals; with steep, 5 feet). For this reason, several methods which are applicable in producing or obtaining the necessary topo maps are discussed here. They include:

- obtaining a map from local town offices,
- onsite surveying to gather exact elevation information and present it in map form,
- the use of a photogrammetric company to fly the site and develop a map with a specified contour interval,
- the use of a USGS map, where it will allow the permit applicant to meet the qualifications required.

Often, local town offices, such as the Building Department or Board of Assessors, have compiled large scale maps which might be helpful in meeting the topographic map requirements. Such a map could be used as a base map if the contour intervals are 2 or 5 feet.

If no suitable topographic mapping of the proposed site location exists, it may be necessary to measure and plot land elevations by conducting a stadia survey. This technique will provide the information necessary for plotting any desired contour interval.

Another method which the applicant might choose to meet the topographic map requirements entails the use of a photogrammetric survey company to fly the site and produce the map required. Such companies are available throughout the U.S. Their abilities include planning and scheduling the flight to collect data for the map, performing the flight, analyzing the results, and compiling a final topographic map. In addition, the applicant could request that this company take the aerial photos needed for fault location or other geologic information, thus fulfilling several requirements at once.

USGS topographic maps are referred to as quadrangle maps. They cover four-sided areas indexed by geographical latitude and longitude. Quadrangle size is given in minutes or degrees; most often a 7.5 minute quadrangle will be desired for RCRA permitting.

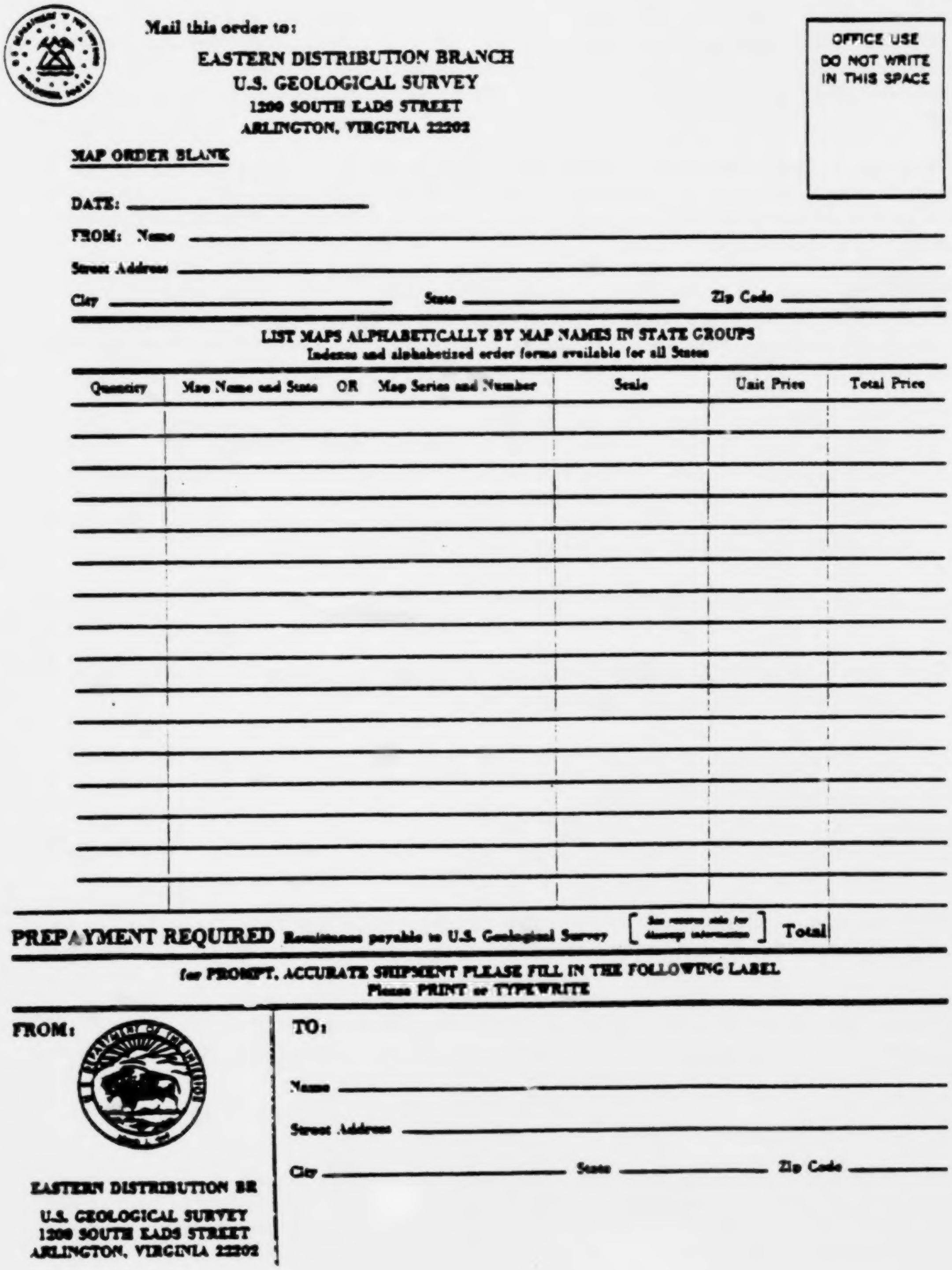
The first step in obtaining a topographic map of the site area is to determine which map(s) are appropriate, i.e. what are the names of the specific quadrangles covering this area. This may be accomplished in any of several ways.

1. The USGS may be contacted in Arlington, VA for areas east of the Mississippi River; Denver, Co. for areas west of the Mississippi River. They would provide the name over the phone or send out an index map for the state in question. The permit applicant could then locate the area on the index map and obtain the name(s) of needed quandrangle(s) in this manner.
2. Index map sets may be available from a local college or University. These could be consulted to determine which quadrangle is desired.
3. Local town offices may be aware of which quadrangle covers their area (town engineer, planners, etc.).
4. Other nearby institutions or firms that deal with land holdings or have extensive properties in the area are likely to have USGS quadrangles for the area.
5. If a geologist is used in any seismic interpretations, this person could easily obtain the quadrangle in question.
6. Maps may be purchased over-the-counter from local USGS offices, map distributers, and other suppliers.

A sample order form is included here as Figure 5-6. RCRA requires a topographic map showing a distance of 1000 feet around the facility. This requirement will determine how many quadrangles are necessary to include and order.

5.13.3 Topographic Map Features

The USGS will provide, free on request, a one-page sheet which shows the topographic map symbols normally found on their maps. These features should also be noted on maps formed through photogrammetry, compiled by surveying, or obtained through town offices. Several of these symbols are described below.



Mail this order to:

EASTERN DISTRIBUTION BRANCH
U.S. GEOLOGICAL SURVEY
1200 SOUTH EADS STREET
ARLINGTON, VIRGINIA 22202

OFFICE USE
DO NOT WRITE
IN THIS SPACE

MAP ORDER BLANK

DATE: ____________________

FROM: Name ____________________

Street Address ____________________

City ____________________ State ____________________ Zip Code ____________________

LIST MAPS ALPHABETICALLY BY MAP NAMES IN STATE GROUPS
Indexes and alphabetized order forms available for all States

Quantity	Map Name and State OR Map Series and Number	Scale	Unit Price	Total Price

PREPAYMENT REQUIRED Remittance payable to U.S. Geological Survey [See reverse side for discount information] Total

for PROMPT, ACCURATE SHIPMENT PLEASE FILL IN THE FOLLOWING LABEL
Please PRINT or TYPEWRITE

FROM:

EASTERN DISTRIBUTION BR
U.S. GEOLOGICAL SURVEY
1200 SOUTH EADS STREET
ARLINGTON, VIRGINIA 22202

TO:

Name ____________________

Street Address ____________________

City ____________________ State ____________________ Zip Code ____________________

Figure 5-6. Sample USGS map order form.

5.13.3.1 Contours--

Contours are imaginary lines following the ground surface at a constant elevation above or below sea level. Contour lines are normally shown in brown on USGS topographic maps. USGS maps vary in contour interval; they are either 5 feet, 10 feet, or 20 feet, depending on the relief involved. The contour interval is reported beneath the scale at the bottom of the map or may be determined by simple inspection of the map. Contour intervals depend on ground slope and map scale. Small contour intervals are used for flat areas; larger contour intervals for mountainous terrain.

The Part 270 regulations require contour intervals of 5 feet with relief of more than 20 feet; and intervals of 2 feet with relief less than 20 feet. Relief is the total change in elevation over the area of concern. The site in question could be mapped using a USGS 5 feet contour map if relief is more than 20 feet within the site area. Otherwise, USGS maps would not provide sufficient detail. Regardless of the mapping system used, major contour intervals should be clearly noted with the applicable land elevation.

5.13.3.2 Scale--

The scale shows the relationship between distance on a map and the corresponding distance on the ground. The scale of USGS topo maps is provided at the bottom of the map in the form of a numerical ratio and graphically using bar scales marked in feet, miles, and kilometers. For example, the numerical ratio 1:24,000 indicates 1 inch on the map equals 24,000 inches on the earth; or 1 cm on the map equals 24,000 cm on the earth, etc. Any map used should clearly indicate scale. The scale must be no smaller than 1 inch = 200 feet (1:2400) to meet RCRA topographic map requirements. However, for larger HWM facilities, the EPA will allow the use of other scales on a case-by-case basis.

5.13.3.3 Date--

The date on which the map was compiled (year of photos used, etc.) should be inserted on the map where new maps or town maps are used. USGS quadrangles provide a date (year) in which aerial photographs were taken (from which the map was compiled) on the bottom left hand corner of the map. In addition, the date of any field check is provided. The most recent revisions to the map are normally added in purple, along with the year of any aerial photographs. Dates are also included in the bottom right hand corner of the map, under the quadrangle name. USGS attempts to update their maps every five years.

5.13.3.4 Surface Waters--

Surface waters, including intermittent streams, must be shown on the topographic map supplied in the application. For USGS topographic maps, USGS symbols should be consulted in determining the various types of surface waters shown. Perennial streams are normally shown as solid blue lines whose thickness relates to stream flow (size). Intermittent streams are usually shown as solid blue lines interrupted by dots at frequent intervals and no exaggeration of width. These surface water types may be contrasted with ephemeral streams which consist of a dry channel throughout most of the year, bearing water only during and after rainfall. Ephemeral streams need not be shown on the topo site map.

All topographic maps should also depict ponds and lakes. The USGS maps show lakes (usually blue), dams, large rapids, marshes, waterfalls, etc.

5.13.3.5 Land Forms/Land Use--

RCRA requires that the site topographic map depict surrounding land uses such as residential, commercial, agricultural, or recreational. This information may be ascertained from sources in local town offices, by first-hand observations, or by using the USGS quadrangle.

The USGS quadrangle indicates buildings (dwellings, places of employment, etc.) usually as solid hatch-marked squares. Schools, churches, and cemetaries are also indicated, as are barns or warehouses. Golf courses are often indicated, as are railroad tracks. Various boundary line types are used to delineate city limits, national or state reservations, small parks, land grants, etc. The breakdown of residential/commercial/agricultural/recreational uses may thus be seen to a great degree from observing a USGS quadrangle map. Applicants not using USGS quads should seek land use information from the local planning board, regional planning commissions, state agencies, etc. In addition, the Geological Survey has special land use maps available for some areas. The applicant can inquire about the area in question at:

Geography Program
Land Information and Analysis Office
USGS - MS 710
Reston, VA 22092

5.13.3.6 Map Orientation--

Part 270 requires that the orientation of the topographic map be displayed using a north arrow. USGS topographic maps include north arrows (showing magnetic north) to the left of the scale at the bottom of each map. Most other maps (land use, town planners, etc.) have such direction indicators.

5.13.4 Obtaining Climatological Information (Wind Rose)

Wind rose information is available through:

National Climatic Center
Department of Commerce
Federal Building
Ashville, North Carolina 28801
(704) 258-2850

Often, the climatic center will refer the caller to a data-collecting office which is local to the area of concern. A wind rose can be inserted on the topographic map with additional wind data noted in accompanying discussion.

5.13.5 Flood Plain Area Maps

An indication of the 100-year floodplain area must be included on the topographic map submitted with your application, as required in §270.14(b)(19)(ii). Additional information which you must submit on flooding is presented in Section 5.11 of this manual.

As a part of the National Flood Insurance Program (NFIP), Flood Hazard Boundary Maps (FHBM) have been prepared for virtually all (20,238) communities that have been identified as "flood prone". The FHMB delineates the boundaries of the 100-year flood plain although they do not provide elevations. Nearly 90 percent of the Federal Emergency Management Agency (FEMA) maps are of this type. In addition, some of the communities that have been accepted into the NFIP have Flood Insurance Rate Maps (FIRM) which delineate the 100-year flood plain and also provide flood elevations. Where these maps are available, determination of the 100 year flood plain is straight-forward. Such maps are most often included as part of a brief Flood Insurance Study for a particular political jurisdiction along a waterway. The U.S. Department of Housing and Urban Development, Federal Insurance Administration which publishes such studies, includes a fold-out map delineating 100-year flood boundaries for various river reaches in the area covered. An original or clear copy of this map (or another suitable map) should be included in the permit for all cases in which sites are located near a river. Hydraulic analyses used to determine the flood level, community description, and principal flood problems and flood protection measures are also provided in the flood insurance studies and should be included in the application.

If a 100-year flood level is not available from another source, the applicant may have to determine the level using a Flood Hazard Boundary Map. The applicant should use a qualified hydrologist for such determinations or may contact the FIA to assist in determining the 100-year flood elevation at the location in question.

FIA does not usually map flood plains that are less than 200 feet wide. In such situations, the applicant will have to make a determination of the extent of the 100-year floodplain. FIA mapping procedures should be used to make this determination, or the applicant can assume it is 200 feet to be conservative The applicant might also consult the U.S. Geological Survey (may have detailed flood-hazard maps of area) the U.S. Army Corps of Engineers, the U.S. Soil Conservation Service, the Office of Coastal Zone Management, or others for floodplain information. All data sources should be noted in the application. In addition, any special flooding factors (e.g. wave action) which might be considered in designing, constructing, operating, or maintaining a facility to withstand washout from a 100-year flood should be included on the map.

5.13.5.1 Site Boundary Maps--

The applicant should include the boundaries of the site land. An official plot plan from town offices should be obtained and included as part of this information.

5.13.6 Other Required Information

Information which should be delineated on the topographic map includes:

- Access control (fences, gates),
- Buildings, treatment, storage, or disposal operation areas and other structures nearby or onsite,
- Barriers for drainage or flood control,
- Operational HWM facility unit locations.

5.13.6.1 Well Locations--

The applicant should designate existing and proposed onsite and offsite wells on the submitted topographic map. Well depth and elevation should be reported for comparison with the submitted cross-section and/or well logs. Cross-section locations should be clearly delineated on the map.

5.13.6.2 Access Control--

Fences and gates are required for security purposes (see Section 5.4) at all hazardous waste management sites. These structures should be indicated on the topographic map submitted.

5.13.6.3 Buildings and Other Structures Nearby or Onsite--

Each existing or proposed building located in the site area should be depicted on the topo map. This will enable the applicant to provide the reviewer with an idea of site operations, transportation routes onsite and offsite, proximity of units to surface waters, relationship to elevation and geology, etc.

5.13.6.4 Barriers for Drainage or Flood Control--

The applicant should show drainage or flood control measures on the topographic map where appropriate.

5.13.6.5 Operational Unit Locations--

The topographic map submitted by the applicant should also include the location of all existing and proposed operational units. Other facility design features such as run-on/run-off control systems and wind dispersal control systems should be shown.

5.13.7 List of Major Points

1. Has a topographic map been provided in the application?
2. Does the map have the required scale and contour intervals?
3. Does the map show the area within 1000 feet of the facility?
4. Does the map clearly show the items identified in §270.14(b)(19)(i) through (xii)?

5.14 MANIFEST SYSTEM, RECORDKEEPING, AND REPORTING

5.14.1 Regulatory Citations

Subpart E--Manifest System, Recordkeeping, and Reporting, of Part 264, is not specifically identified in the Part 270 permit information requirements. Although permit applicants are not required to submit material to demonstrate compliance with Subpart E with their permit applications, failure to comply with the Subpart E requirements is a violation of any permit that may be issued.

The owners and operators of existing and interim status facilities should be especially cognizant of the Subpart E requirements for two reasons. First, they should already be complying with these requirements as required by Subpart E of the interim status regulations in Part 265. Second, the review of a Part B permit application by the permitting authority is very likely to include a thorough site inspection of the applicant's facility. During that inspection, the applicant can expect to be asked to show that his manifesting, recordkeeping, and reporting procedures do comply with the Part 264 Subpart E requirements. Applicants who cannot demonstrate a thorough knowledge of those requirements, or whose procedures are identified as not complying with the requirements during the inspection, could delay or jeopardize the approval of their permit application.

Subpart E of Part 264 is reproduced below.

> "Subpart E--Manifest System, Recordkeeping, and Reporting
>
> §264.70 Applicability.
> The regulations in this Subpart apply to owners and operators of both on-site and off-site facilities, except as §264.1 provides otherwise. Sections 264.71, 264.72, and 264.76 do not apply to owners and operators of on-site facilities that do not receive any hazardous waste from off-site sources.
>
> §264.71 Use of manifest system.
> (a) If a facility receives hazardous waste accompanied by a manifest, the owner or operator or his agent, must:
> (1) Sign and date each copy of the manifest to certify that the hazardous waste covered by the manifest was received;
> (2) Note any significant discrepancies in the manifest (as defined in §264.72(a)) on each copy of the manifest;
> (3) Immediately give the transporter at least one copy of the signed manifest;
> (4) Within 30 days after the delivery, send a copy of the manifest to the generator; and
> (5) Retain at the facility a copy of each manifest for at least three years from the date of delivery.
> (b) If the facility receives, from a rail or water (bulk shipment) transporter, hazardous waste which is accompanied by a shipping paper containing all the information required on the

manifest (excluding the EPA identification numbers, generator's certification, and signatures), the owner or operator, or his agent must:

(1) Sign and date each copy of the manifest or shipping paper (if the manifest has not been received) to certify that the hazardous waste covered by the manifest or shipping paper was received;

(2) Note any significant discrepancies (as defined in §264.72(a)) in the manifest or shipping paper (if the manifest has not been received) on each copy of the manifest or shipping paper.

(3) Immediately give the rail or water (bulk shipment) transporter at least one copy of the manifest or shipping paper (if the manifest has not been received);

(4) Within 30 days after the delivery, send a copy of the signed and dated manifest to the generator; however, if the manifest has not been received within 30 days after delivery, the owner or operator, or his agent, must send a copy of the shipping paper signed and dated to the generator; and

(5) Retain at the facility a copy of the manifest and shipping paper (if signed in lieu of the manifest at the time of delivery) for at least three years from the date of delivery.

(c) Whenever a shipment of hazardous waste is initiated from a facility, the owner or operator of that facility must comply with the requirements of Part 262 of this chapter.

§264.72 Manifest discrepancies.

(a) Manifest discrepancies are differences between the quantity or type of hazardous waste designated on the manifest or shipping paper, and the quantity or type of hazardous waste a facility actually receives. Significant discrepancies in quantity are: (1) For bulk waste, variations greater than 10 percent in weight, and (2) for batch waste, any variation in piece count, such as a discrepancy of one drum in a truckload. Significant discrepancies in type are obvious differences which can be discovered by inspection or waste analysis, such as waste solvent substituted for waste acid, or toxic constituents not reported on the manifest or shipping paper.

(b) Upon discovering a significant discrepancy, the owner or operator must attempt to reconcile the discrepancy with the waste generator or transporter (e.g., with telephone conversations). If the discrepancy is not resolved within 15 days after receiving the waste, the owner or operator must immediately submit to the Regional Administrator a letter describing the discrepancy and attempts to reconcile it, and a copy of the manifest or shipping paper at issue.

§264.73 Operating record.

(a) The owner or operator must keep a written operating record at his facility.

(b) The following information must be recorded as it becomes available, and maintained in the operating record until closure of the facility:

(1) A description and the quantity of each hazardous waste received, and the method(s) and date(s) of its treatment, storage, or disposal at the facility as required by Appendix I;

(2) The location of each hazardous waste within the facility and the quantity at each location. For disposal facilities, the location and quantity of each hazardous waste must be recorded on a map or diagram of each cell or disposal area. For all facilities, this information must include cross-references to specific manifest document numbers, if the waste was accompanied by a manifest;

(3) Records and results of waste analyses performed as specified in §§264.13, 264.17, and 264.341;

(4) Summary reports and details of all incidents that require implementing the contingency plan as specified in §264.56(j);

(5) Records and results of inspections as required by §264.15(d) (except these data need be kept only three years);

(6) Monitoring, testing, or analytical data where required by Subpart F and §§264.226, 264.253, 264.254, 264.276, 264.278, 264.280, 264.303, 264.309, and 264.347;

(7) For off-site facilities, notices to generators as specified in §264.12(b); and

(8) All closure cost estimates under §264.142, and, for disposal facilities, all post-closure cost estimates under §264.144.

§264.74 Availability, retention, and disposition of records.

(a) All records, including plans, required under this Part must be furnished upon request, and made available at all reasonable times for inspection, by any officer, employee, or represenative of EPA who is duly designated by the Administrator.

(b) The retention period for all records required under this Part is extended automatically during the course of any unresolved enforcement action regarding the facility or as requested by the Administrator.

(c) A copy of records of waste disposal locations and quantities under §264.73(b)(2) must be submitted to the Regional Administrator and local land authority upon closure of the facility.

§264.75 Biennial report.

The owner or operator must prepare and submit a single copy of a biennial report to the Regional Administrator by March 1 of each even numbered year. The biennial report must be submitted on EPA form 8700-13B. The report must cover facility activities during the previous calendar year and must include:

(a) The EPA identification number, name, and address of the facility;

(b) The calendar year covered by the report;

(c) For off-site facilities, the EPA identification number of each hazardous waste generator from which the facility received a hazardous waste during the year; for imported shipments, the report must give the name and address of the foreign generator;

(d) A description and the quantity of each hazardous waste the facility received during the year. For off-site facilities, this information must be listed by EPA identification number of each generator;

(e) The method of treatment, storage, or disposal for each hazardous waste;

(f) [Reserved]

(g) The most recent closure cost estimate under §264.142, and, for disposal facilities, the most recent post-closure cost estimate under §264.144; and

(h) The certification signed by the owner or operator of the facility or his authorized representative.

§264.76 Unmanifested waste report.

If a facility accepts for treatment, storage, or disposal any hazardous waste from an off-site source without an accompanying manifest, or without an accompanying shipping paper as described in §263.20(e)(2) of this Chapter, and if the waste is not excluded from the manifest requirement by §261.5 of this Chapter, then the owner or operator must prepare and submit a single copy of a report to the Regional Administrator within fifteen days after receiving the waste. The unmanifested waste report must be submitted on EPA form 8700-13B. Such report must be designated 'Unmanifested Waste Report' and include the following information:

(a) The EPA identification number, name, and address of the facility;

(b) The date the facility received the waste;

(c) The EPA identification number, name, and address of the generator and the transporter, if available;

(d) A description and the quantity of each unmanifested hazardous waste the facility received;

(e) The method of treatment, storage, or disposal for each hazardous waste;

(f) The certification signed by the owner or operator of the facility or his authorized representative; and

(g) A brief explanation of why the waste was unmanifested, if known.

§264.77 Additional reports.

In addition to submitting the biennial reports and unmanifested waste reports described in §§264.75 and 264.76, the owner or operator must also report to the Regional Administrator:

(a) Releases, fires, and explosions as specified in §264.56(j);

(b) Facility closures specified in §264.115; and

(c) As otherwise required by Subparts F and K-N.

§264.78-264.89 [Reserved]

5.14.2 Guidance to Achieve the Part 264 Standards

The purpose of Subpart E of Part 264 is to establish specific handling procedures for records of waste movement. The requirements in Subpart E are the heart of the "cradle-to-grave" tracking system that the EPA has established for movements of hazardous wastes.

The applicability statement in §264.70 indicates that the regulations apply to all owners and operators of hazardous waste treatment, storage, and disposal facilities. However, the regulations make a distinction between facilities used to treat, store, or dispose of wastes generated on the same property (onsite facilities) and facilities used to treat, store, or dispose of wastes that were not generated on the facility property (offsite facilities). Specifically, owners and operators of onsite facilities are not required to utilize a manifest system if they do not receive any hazardous waste from offsite sources. However, they are still required to comply with the manifest system standards contained in Subpart B of Part 262 if they ship hazardous waste off of their property. The owners and operators of all facilities, regardless of whether they are onsite or offsite facilities, must comply with the requirements of §§264.73, 264.74, 264.75, and 264.77.

The requirements for manifest handling with which owners or operators of hazardous waste treatment, storage, or disposal facilities must comply are contained in §264.71. Two handling procedures are identified, one for manifests which accompany hazardous wastes received, and one for shipping papers accompanying hazardous wastes received from rail or water (bulk shipment) transporters. The procedures for handling either manifests or shipping papers are identical. They are:

1. Sign to certify receipt of the waste,
2. Note, on the document, discrepancies between the document and the wastes received,
3. Immediately give a signed copy to the person delivering the waste,
4. Send a signed copy to the generator within 30 days, and
5. Keep a signed copy on file for 3 years from date of receipt.

Waste analyses do not have to be performed immediately upon receipt to identify discrepancies. The discrepancies that should be noted on the manifest or shipping papers are obvious ones that can be immediately determined by counting or measuring the waste received and comparing the manifest or shipping papers with labels on the waste.

A description of what a discrepancy is and the actions that must be taken when a discrepancy is identified either on receipt or during later waste analyses are presented in §264.72. The description of discrepancies in quantity presented in §264.72(a) identifies any difference in piece count for batch waste and greater than a 10 percent difference in quantity for bulk wastes as significant discrepancies. However, the receiver of bulk wastes should use judgment regarding whether or not to adhere to the 10 percent requirement based on the size of the bulk shipment received. Any difference between the amount of the bulk shipment stated on the manifest or shipping papers and the amount actually received should be noted on the documents at the time of receipt. The receiver should then decide whether or not to take the actions identified in §264.72(b) based on the quantity of difference and not the percent of difference for bulk shipments.

In §264.72(b), receivers of hazardous waste are required to attempt to reconcile significant discrepancies with the generator or transporter within 15 days of receiving a waste. If your permit requires you to analyze incoming waste, you must still attempt to reconcile differences within the "15 days from receipt" limit. It is therefore to your advantage to perform any required analyses as soon as possible after receipt to avoid the reporting requirement if analysis identifies a discrepancy.

If identified discrepancies in type or quantities of waste received cannot be reconciled within 15 days of receipt, the receiver must immediately notify the Regional Administrator. The notification must include a letter describing the discrepancy and attempts to reconcile it, and include copies of the subject manifests or shipping papers.

Owners and operators of hazardous waste treatment, storage, or disposal facilities are required by §264.73(a) to keep a written operating record. Eight items of information which must be recorded in the operating record are identified in §264.73(b). They are:

1. Records on wastes received and treated, stored, or disposed;

2. Records on locations of wastes within the facility,

3. Waste analyses results,

4. Records of contingency plan implementation,

5. Inspection records,

6. Ground water monitoring, testing, or analytical data,

7. Notices of permit acquisition and waste acceptance to generators,

8. Closure and post-closure estimates.

All of the information that is required to be entered into the operating record must be retained until the facility is closed, except for inspection records which need be kept for only 3 years from the date of inspection.

Appendix I of Part 264, referenced in §264.73(b)(1), contains recordkeeping instructions for a portion of the operating record. Specifically, it identifies how to record the information required by §264.73(b)(1).

The requirements of §264.74 place stipulations on handling of all records relative to Part 264. Specifically, they require that you must allow authorized Agency personnel to inspect the records, that you must retain records for longer than required by the regulations if you are involved in enforcement actions or are requested to retain them by the Agency, and that you must submit copies of the records required by §264.73(b)(2) to the local land authority and EPA when you close the facility.

Section 264.75 requires that you submit a biennial report of your activities on a form prescribed by the EPA. The form is identified as EPA form 8700-13B and copies are available from the EPA offices identified in Appendix A of this manual. The information which must be supplied in a biennial report is identified in §264.75(a) through (h). The EPA established the biennial reporting requirement on January 28, 1983. The first biennial report is due on March 1, 1984. Note that submission of the first biennial report is due on that date even if you have not received a permit by that time. Owners and operators of facilities who have not received permits should refer to the biennial reporting requirements in Subpart E, §265.75 of Part 265. Additional information on the biennial report can be found in the January 28, 1983, Federal Register at page 3977.

The requirements of §264.76 establish procedures which must be followed if hazardous wastes are received without an accompanying manifest or shipping paper. Those requirements indicate that an "Unmanifested Waste Report" must be submitted to the EPA within 15 days of receiving the waste. The EPA has identified the same form (EPA form 8700-13B) as used for the biennial report as the form to be used for an Unmanifested Waste Report. The informational items which must be included on that report form are identified in §264.76(a) through (g). Additional information on this type of report can be found in the January 28, 1983, Federal Register at page 3981.

The last section of Subpart E in Part 264, §264.77, identifies additional reports that must be made to the EPA. They include reports of hazardous waste releases, fires, explosions, closures, or any other reports that may be required in Subparts F and K through N of Part 264. Owners and operators of hazardous waste treatment, storage, or disposal facilities should review those Subparts to determine if they contain any reporting requirements applicable to their operations.

5.14.3 List of Major Points

Subpart E of Part 264 does not require the submission of any information with the Part B permit application. However, the following are questions that each applicant should bear in mind during preparation and submission of the Part B:

1. Are you familiar with and do you understand the requirements set forth in §§264.70 through 264.77?

2. Have you compared your existing procedures for manifest handling, recordkeeping, and reporting to the Subpart E requirements and corrected or instituted procedures that comply with Subpart E requirements when those procedures were lacking?

3. Are your personnel who are handling manifests or performing recordkeeping or reporting familiar with the Subpart E requirements? Have they been trained in the procedures you have instituted to comply with Subpart E?

4. Have you checked Subparts F and K through N of Part 264 to make sure that any recordkeeping or reporting necessary in addition to Subpart E is being conducted?

5. Have you checked Subparts E, F, and K through N of Part 265 to insure that past activities have complied with any manifest system, recordkeeping, or reporting requirements contained in those Subparts?

6. If your facility is inspected during the permit application review process, do you know where the various records are kept so that they can be promptly located for the inspector's review?

6.0 COMPLETENESS CHECKLIST

This section contains a checklist of items which must be included in a RCRA permit application. The checklist separately covers Part A and B for a land storage, treatment, and disposal permit application.

The checklist is forty-one (41) pages long and addresses more permit application requirements than are discussed in this manual. However, items related to the topics presented in this manual (the general information requirements of §270.14(b)) can be found on pages 3 through 14 and 21 of the checklist.

Use of this checklist is not a regulatory requirement. However, its use, or use of any similar type document, is strongly recommended. By completing and submitting this type of document, you will have developed both a summary and a table of contents for your permit application. It will also assist the reviewing agency and enable a more expeditious review of your application. Its use will assist you in confirming that you are submitting a complete application.

Each required information item is briefly stated. Regulatory citations are provided which enable quick location of the full text of the regulation that contains each required item (if no citation is indicated next to a specific item, the last citation indicated above the item contains the requirement).

Space is provided so that you can indicate whether the item is included in your application or did not apply. Space is also provided so that you can record the page number or other indication of where the item can be found in your application.

The required items are generally listed in the sequence that they are presented in §§270.13, 270.14, 270.17, 270.18, 270.20, and 270.21 of the regulations except where presentation of information from a later section is specifically requested. The one exception is that the additional information requested in §270.14(c) is listed at the end of the checklist beginning on page 35.

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.10(d) and 270.13		Part A Requirements				
270.13(g)		- Statement that facility is new or existing	______	______	______	______
270.13(g)		- Statement that application is first or revised	______	______	______	______
270.13(m)		- Description of business conducted	______	______	______	______
270.13(c)		- SIC Codes	______	______	______	______
270.13(a)		- Description of activities requiring permit	______	______	______	______
270.13(b)		- Facility: Name	______	______	______	______
270.13(b)		- Mailing Address	______	______	______	______
270.13(b)		- Location	______	______	______	______
270.13(b)		- Latitude and Longitude	______	______	______	______
270.13(h)(1)		- Scale drawing (existing facility only)	______	______	______	______
		- Sufficient detail	______	______	______	______
270.13(l)		- Topographic Map	______	______	______	______
		- Sufficient detail	______	______	______	______
270.13(l)		- Other map	______	______	______	______
		- Sufficient detail	______	______	______	______
270.13(h)(2)		- Photographs (existing facilities only)	______	______	______	______
		- Sufficient detail	______	______	______	______
270.13(e)		- Owner: Name	______	______	______	______
		- Address	______	______	______	______
		- Telephone	______	______	______	______
270.13(d)		Operator: Name	______	______	______	______
		- Address	______	______	______	______
		- Telephone	______	______	______	______

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.13(d)		- Identification of facility ownership status and status as Federal, State, private, public, or other entity				
270.13(f)		- Statement that facility is or is not on Indian lands				
270.13(k)		- Listing of all permits and construction approvals received/applied for				
270.13(j)		- List of 40 CFR 261 wastes and annual amounts to be handled				
270.13(i)		- Description of all processes to be used to handle wastes and design capacity of each process				
		Part A Certification and Signatories				
270.11(d)		- Certification paragraph				
270.11(a)		- Appropriate signatory				

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.14		Part B General Information Requirements				
270.14(b)(1)		- General description of the facility				
270.14(b)(2)	264.13(a)	- Chemical and physical analysis of hazardous wastes to be handled				
270.14(b)(3)		- Waste analysis plan				
	264.13(b) (1)-(5)	- Analysis parameters with rationale				
		- Test methods for analyzing parameters				
		- Procedure for collecting representative samples				
		- Frequency of analyses				
		- List and description of waste analyses to be generator supplied				
	264.13(b)(6) and 264.17(c)	- Waste analysis procedures for ignitable, reactive, incompatible wastes				
	264.13(c)	- Procedures to determine identity of each waste movement				
		- Procedures for collecting representative samples				
270.14(b)(4)		- Security description for active portion of facility				
	264.14(a)	- Security procedures waiver justification				
		- Unknowing/unauthorized contact with waste not harmful				
		- Unknowing/unauthorized disturbance of waste or equipment cannot cause violation of Part 264				

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.14(b)(4)	264.14(b)	- Description of 24-hour surveillance system				
		- Description of artificial or natural barriers				
		- Description of controlled entry/egress procedures				
	264.14(c)	- Description of warning signs				
		- List of languages on signs				
		- Statement of 25-foot legibility				
		- Description of sign locations and numbers of signs				
270.14(b)(5)		- General Inspection Schedule and Procedures Description				
	264.15(b)(1)	- Written schedule				
	264.15(b)(2) and 265.15(d)	- Statement as to where, at facility, inspection schedule and inspection records will be kept				
	264.15(b)(1)	- Identification of equipment/processes to be inspected				
	264.15(b)(3)	- Identification of types of problems each equipment/process to be checked for				
	264.15(b)(4)	- Frequency of inspections by equipment/process				
	264.15(c)	- Schedule of remedial action				
270.14(b)(5) and 270.17(d)	264.15(a) and 264.226	- Specific Inspection Requirements for Surface Impoundments				
		- Description of procedures for				
		- Inspection of liners/covers during and immediately after installation				

Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.14(b)(5) and 270.17(d)	264.15(a) and 264.226	- Inspections weekly and after storms for				
		- Operation of overtopping controls				
		- Sudden drop in impoundment liquid level				
		- Presence of liquid in leak detection system				
		- Integrity of dikes/containment devices				
		- Statement from qualified engineer that structural integrity of dikes will be certified upon construction completion				
		- Qualified engineer's certification of dike integrity for				
		- Stress				
		- Piping/scouring				
270.14(b)(5) and 270.18(e)	264.15(a) and 264.254	- Specific Inspection Requirements for Waste Piles				
		- Description of procedures for				
		- Inspection of liners/covers during and immediately after installation				
		- Inspections weekly and after storms for				
		- Operation of run-on/run-off controls				
		- Liquids in leak detection system				
		- Proper functioning of wind dispersal controls				
		- Leachate in and proper operation of leachate collection/removal system				

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.14(b)(5) and 270.20(c)(5)	264.15(a) and 264.273(g)	- Specific Inspection Requirements for Land Treatment Units	____	____	____	____
		- Description of procedures for units inspections weekly and after storms for	____	____	____	____
		- Operation of run-on/run-off controls	____	____	____	____
		- Function of wind dispersal controls	____	____	____	____
270.14(b)(5) and 270.21(d)	264.15(a) and 264.303	- Specific Inspection Requirements for Landfills	____	____	____	____
		- Description of procedures for	____	____	____	____
		- Inspection of liners/covers during and immediately after installation	____	____	____	____
		- Inspections weekly and after storms for	____	____	____	____
		- Operation of run-on/run-off controls	____	____	____	____
		- Liquids in leak detection system	____	____	____	____
		- Proper functioning of wind dispersal controls	____	____	____	____
		- Leachate in and proper operation of leachate collection/removal system	____	____	____	____
270.14(b)(6)	Part 264 Subpart C	- Preparedness and Prevention Documentation	____	____	____	____
		- Waiver(s) request and justification	____	____	____	____
	264.32(a)	- Description of internal communications/alarm system(s)	____	____	____	____
	264.34(a)	- Documentation of personnel access to internal communication/alarm system(s)	____	____	____	____
	264.32(b)	- Description of external communications/alarm system(s)	____	____	____	____
	264.34(b)	- Documentation of personnel access to external communication/alarm system(s)	____	____	____	____

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.14(b)(6)	264.32(c)	- Description of fire control/ extinguishing, spill control, and decontamination equipment				
	264.32(d)	- Documentation of adequate water volume and pressure for above equipment				
	264.33	- Documentation of equipment testing/ maintenance schedule and procedures				
	264.35	- Documentation of adequate aisle space				
	264.37 (also 264.52(c))	- Documentation and descriptions of arrangements or attempts at arrangements with;				
		- Police department(s)				
		- Fire department(s)				
		- Hospitals				
		- Local emergency response teams				
		- State emergency response teams				
		- Emergency response contractors				
		- Equipment suppliers				
	264.37(a)(2)	- Documentation of agreements designating primary emergency authority				
270.14(b)(7)	Part 264 Subpart D	- Contingency Plan Documentation				
	264.51 and 264.52(a)	- Criteria for implementation of contingency plan				
	264.52(d)	- Emergency Coordinator Identification				
		- Name				
		- Addresses				

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.14(b)(7)		- Home/Work Phones				
	264.55	- Documentation of Qualifications				
		- Documentation of Authority				
		- Description of notification procedure				
	264.52(e)	- Emergency equipment list				
		- Documentation of equipment location				
		- Physical description of equipment				
		- Statement of equipment capabilities				
	264.52(f)	- Evacuation Plan				
		- Criteria for implementation				
		- Description of signal(s) to implement				
		- Description of primary and alternate routes				
	264.53	- Contingency Plan Copy Location				
		- Description of location of facility's copy of plan				
		- Number of duplicate copies distributed and their location				
	264.54	- Contingency Plan Amendment				
		- Identification of person responsible and authorized to change/amend plan				
		- Description of procedure to change/amend facility copy of plan				
		- Description of procedure to insure update of all copies of plan				

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.14(b)(7)	264.56	- Detailed Emergency Procedures.	______	______	______	______
		- Procedure for facility personnel notification	______	______	______	______
		- Procedure for state/local agency notification	______	______	______	______
		- procedure for identification of character, source, amount, and areal extent of released materials	______	______	______	______
		- Procedure for assessment of environment/human health hazards	______	______	______	______
		- Identification of On-Scene Coordinator for geographic area	______	______	______	______
		- Description of specific responses and control procedures for	______	______	______	______
		- Fire	______	______	______	______
		- Explosion	______	______	______	______
		- Spill	______	______	______	______
		- Description of process shutdown and monitoring procedures	______	______	______	______
		- Description of cleanup procedures and associated material treating, storing, disposal procedures	______	______	______	______
		- Description of emergency equipment cleaning and refitting procedures	______	______	______	______
		- Description of procedures to insure incompatible waste segregation during cleanup	______	______	______	______
270.14(b)(7) and 270.17(f)	264.227	- Specific Contingency Plan Requirements for Surface Impoundments	______	______	______	______
		- Procedure for stopping waste addition to impoundment	______	______	______	______

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
	264.227	- Procedure for containing leakage				
		- Procedure to prevent catastrophic failure				
		- Procedure for emptying impoundment				
		- Procedure for recertifying and reactivating impoundment				
		- Procedure for closing impoundment				

[Note: There are no §122.25 requirements which parallel Part 264, Subpart E. However, the applicant should be familiar with the following sections of the regulations since the requirements in them will be enforceable under any permit received.
Part 264, Subpart E, §264.70 through §264.77
Part 270, Subpart C, §270.30(j) and §270.30(l)
The applicant should be prepared to respond to inquiries by the permit application reviewers regarding these requirements]

Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.14(b)(8)		- Preventive Procedures, Structures, and Equipment Documentation, including descriptions of equipment/procedures to				
		- Prevent hazards during unloading operations				
		- Prevent run-off and flooding				
		- Prevent water supply contamination				
		- Mitigate equipment failure and power outages				
		- Prevent undue personnel exposure to wastes				
270.14(b)(9)	264.17	- Prevention of Accidental Ignition or Reaction Documentation				
		- Description of separation and protection of ignitable, reactive, incompatible wastes				
		- Description of ignitable, reactive, incompatible wastes handling procedures				
		- Description of number, location, and type of warning/prohibition signs				

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
		- Documentation that procedures are adequate to prevent accidental ignitions or reactions				
		- Description of number, location, and type of warning/prohibition signs				
		- Documentation that procedures are adequate to prevent accidental ignitions or reactions				
270.14(b)(9) and 270.17(h) and 270.17(i)	264.17(b)	- Specific Ignitable/Reactive Waste Requirements for Surface Impoundments				
	264.229	- Procedures that render waste nonreactive or nonignitable				
		- Procedures for preventing reactions				
		- Procedures for protecting wastes				
		- "Emergency use only" documentation				
	264.230	- Incompatible waste segregation or protection procedures				
270.14(b)(9) and 270.18(g) and 270.18(h)	264.17(b)	- Specific Ignitable/Reactive Waste Requirements for Waste Piles				
	264.256	- Procedures that render waste nonreactive or nonignitable				
		- Procedures for preventing reactions				
		- Procedures for protecting wastes				
	264.257	- Incompatible waste segregation or protection procedures				
270.14(b)(9) and 270.20(g) and 270.20(h)	264.17(b)	- Specific Ignitable/Reactive Waste Requirements for Land Treatment Facilities				
	264.281	- Documentation that application to soil renders waste nonreactive/nonignitable and prevents reactions				
		- Procedures for protecting wastes				

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
	264.282	- Procedures which insure that incompatible wastes are not applied to same treatment zone	____	____	____	____
270.14(b)(9) and 270.21(f) and 270.21(g)	264.17(b)	- Specific Ignitable/Reactive Waste Requirements for Landfills	____	____	____	____
	264.312	- Procedures that render wastes nonreactive and nonignitable	____	____	____	____
		- Procedures for preventing reactions	____	____	____	____
		- Procedures for protecting wastes	____	____	____	____
	264.313	- Procedures for insuring that incompatible wastes will not be disposed of in same landfill cell	____	____	____	____
	264.316 (c)-(e)	- Procedures for identifying contents and insuring proper landfilling of incoming labpacks	____	____	____	____
270.14(b)(10)		- Traffic Documentation*	____	____	____	____
		- Identification of;	____	____	____	____
		- Waste movement routes	____	____	____	____
		- Number of movements by type vehicle	____	____	____	____
		- Quantity of waste moved per movement per vehicle	____	____	____	____
		- Traffic control sign personnel	____	____	____	____
		- Route surface composition and load bearing capacity	____	____	____	____
270.14(b)(11)		- Facility Location Documentation	____	____	____	____
270.14(b)(11) (i) and (ii)		- Political jurisdiction identified (new facilities only)	____	____	____	____
		- Comparison to Appendix VI of Part 264	____	____	____	____

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*There are no standards in Part 264 for traffic movement. The information that must be submitted with the Part B permit application, as required by §270.14(b)(10), will be used by the Agency to evaluate safety at the facility.

Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
		- Demonstration that faults with displacement in Holocene time are more than 3000 feet from facility				
	264.18(a)	- Demonstration that no faults pass within 200 feet of sites where T/S/D to be conducted				
270.14(b)(11)(iii)-(iv)	264.18(b)	- Documentation of facility location relative to 100-year flood plain level or wave action flooding				
		- Documentation that facility can withstand the 100-year flood without washout of hazardous waste by:				
		- Analysis of hydrodynamic/hydrostatic forces resulting at site from 100-year flood, and				
		- Presentation of operating units and flood protection devices design and how they will prevent washout, or				
		- Plan for removal of waste before washout including,				
		- Timing of removal relative to flood levels				
		- Estimated time to remove all waste				
		- Location to which waste will be moved and proof of compliance with Parts 122 through 124 and 264 through 267 of this Chapter				
		- Detailed description of personnel, equipment, and procedures for waste removal sufficient to insure availability in time for use				
		- Analysis of potential for discharge during waste movement				

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.14(b)(11)(v)		- A plan documenting how and on what time schedule the facility will comply with §264.18(b) if not in compliance (existing facilities only).				
270.14(b)(12)	264.16	- Personnel Training Program Documentation				
		- Outline of introductory and continuing personnel training programs*				
		- Identification and qualifications of program instructor				
		- Brief description of how training program meets actual job tasks*				
		- Description of procedures to insure all appropriate personnel receive appropriate training and receive annual training review				
		- Description of records to be kept, their location, and procedures to insure they are retained for proper length of time				
270.14(b)(13)	264.112	- Closure Plan Documentation				
		- Description of partial and final closure procedures				
		- Description of maximum unclosed portion during facility life				
		- Estimate of maximum waste inventory in storage/treatment during facility life				
	264.114	- Equipment decontamination procedure				
		- Estimated year of closure				
	264.113	- Description of closure schedule including				
		- Total time to close				

*This documentation on Personnel Training must be included in the application. The remaining three items may be included at the applicant's discretion.

Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.14(b)(13)	264.113	- Trackable intervening closure activities				
		- Location(s) and number of copies of closure plan				
		- Identification of person responsible for storage and updating of facility copy of closure plan				
		- Procedure for updating all other copies of closure plan				
270.14(b)(13) and 270.17(g)	264.112 and 264.228(a)	- Specific Closure Plan Requirements for Surface Impoundments				
		- Procedures for removal and/or decontamination of all wastes and materials/equipment associated with the impoundment, or				
		- Detailed plans and engineering reports describing				
		- Elimination of free liquids				
		- Stabilization of remaining wastes				
		- Design of final cover demonstrating				
		- Liquid migration minimization				
		- Function with minimum maintenance				
		- Drainage promotion				
		- Erosion/abrasion minimization				
		- Settling/subsidence accomodation				
		- Permeability less than liner or subsoils				

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.14(b)(13) and 270.18(i)	264.112	- Specific Closure Plan Requirements for Waste Piles	____	____	____	____
	264.258(a)	- Procedure for removal and/or decontamination of all wastes and materials/equipment associated with the waste pile	____	____	____	____
	264.258(b)	- Procedure for closing in conformance with landfill closing requirements	____	____	____	____
270.14(b)(13) and 270.20(f)	264.112	- Specific Closure Plan Requirements for Land Treatment Facilities	____	____	____	____
	264.280(a)	- Procedures to minimize degradation of waste in treatment zone	____	____	____	____
		- Procedures to minimize waste run-off	____	____	____	____
		- Run-off system maintenance procedures	____	____	____	____
		- Wind dispersal control procedures	____	____	____	____
		- Procedures for compliance with food-chain crop growth	____	____	____	____
		- Procedures for unsaturated zone monitoring	____	____	____	____
		- Description of vegetative cover	____	____	____	____
		- Procedures for establishing vegetative cover	____	____	____	____
270.14(b)(13) and 270.21(e)	264.112 and 264.310(a)	- Specific Closure Plan Requirements for Landfills	____	____	____	____
		- Detailed plans and an engineering report which describes the final cover components in detail	____	____	____	____
		- Documentation that the final cover will	____	____	____	____
		- - Provide long-term minimization of migration of liquids through closed landfill	____	____	____	____

Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
		- Function with minimum maintenance				
		- Promote drainage and minimize erosion/abrasion				
		- Settle/subside without losing integrity				
		- Be less permeable than bottom liners or subsoils				
270.14(b)(13)	264.117 and 264.118	- Post-Closure Plan Documentation				
		- Description of ground water monitoring activities and frequencies				
		- Description of maintenance activities and frequencies for;				
		- Final containment structures				
		- Facility monitoring equipment				
		- Location(s) and number of copies of post-closure plan				
		- Identification and location (address and phone number) of person responsible for storage and updating of facility copy of post-closure plan prior to closure				
		- Identification and location (address and phone number) of person responsible for storage and updating facility copy of post-closure plan during post-closure period				
		- Procedure for updating all other copies of post-closure plan				
270.14(b)(13) and 270.17(g)	264.118 and 264.228(b)	- Specific Post-Closure Plan Requirements for Surface Impoundments				
		- Procedures for maintenance and repair of final cover				

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Part 270	Part 264		Subject Requirement	Provided	Not Applicable	Location in Application	Comments
		-	Procedures for maintenance and monitoring of leak detection system				
		-	Procedures for maintenance and monitoring of ground water monitoring system				
		-	Procedures for compliance with Subpart F				
		-	Procedures for preventing run-on/run-off final cover damage				
270.14(b)(13) and 270.18(i)	264.118 and 264.258(b)	-	Specific Post-Closure Plan Requirements for Waste Piles				
		-	Procedures for post-closure care that meet the requirements for landfills				
270.14(b)(13) and 270.20(f)	264.118 and 264.280(c)	-	Specific Post-Closure Plan Requirements for Land Treatment Facilities				
		-	Procedures to enhance degradation of wastes in treatment zone				
		-	Procedure for maintaining vegetative cover				
		-	Procedure for maintaining run-on controls				
		-	Procedure for maintaining run-off controls				
		-	Procedures for wind dispersal control				
		-	Procedures to insure compliance with food-chain crop prohibitions				
		-	Procedures for unsaturated zone monitoring				
270.14(b)(13) and 270.21(e)	264.118 and 264.310(b)	-	Specific Post-Closure Plan Requirements for Landfills				
		-	Procedures for maintenance and repair of final cover				
		-	Monitoring and maintenance procedures for leak detection system				

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
		- Procedure for leachate collection/removal system operation				
		- Procedures to maintain and monitor ground water monitoring system				
		- Procedures for compliance with Subpart F				
		- Procedures for preventing final cap erosion due to run-on and run-off				
		- Procedures for protection and maintenance of benchmarks				
	264.310(c)	- Procedures to be undertaken if liquid is found in leak detection system				
270.14(b) (14)	264.120	- Documentation of Notice on Deed (existing facilities only)				
		- Statement that land used to manage wastes				
		- Statement of restricted use per §264.117(c)				
	264.119	- Documentation of type, location, and quantity of wastes filed with local authority and EPA Regional Administrator				
270.14(b) (15)	264.142	- Closure Cost Estimate				
	264.143 and 264.146	- Documentation of a financial assurance mechanism for closure that is:				
	264.151(a)	- Closure trust fund				
	264.151(b)	- Surety bond guaranteeing payment				
	264.151(c)	- Surety bond guaranteeing performance				
	264.151(d)	- Closure letter of credit				
	264.151(e)	- Closure insurance				
	264.151(f) and (h)	- Financial test and corporate guarantee				

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
		- Multiple financial mechanism for one facility				
		- Single financial mechanism for multiple facilities				
270.14(b)(16)	264.144	- Post-Closure Cost Estimate				
	264.145 and 264.146	- Documentation of a financial assurance mechanism for post-closure that is;				
	264.151(a)	- Closure trust fund				
	264.151(b)	- Surety bond guaranteeing payment				
	264.151(c)	- Surety bond guaranteeing performance				
	264.151(d)	- Post-closure letter of credit				
	264.151(e)	- Post-closure insurance				
	264.151(f) and (h)	- Financial test and corporate guarantee				
		- Multiple financial mechanism for one facility				
		- Single financial mechanism for multiple facilities				
270.14(b)(17)	264.147	- Documentation of Insurance.				
		- Request for variance from insurance				
	264.151(i) and (j)	- Insurance for sudden/accidental occurrences				
		- Insurance for nonsudden/accidental occurrences				
	264.151(g)	- Financial test for liability coverage				

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Part 270	Part 264		Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.14(b) (18)	264.149	-	Documentation of a State Required Financial Mechanism for Closure, Post-Closure, or Liability including				
			- EPA I.D. number				
			- Facility name				
			- Facility address				
			- Amounts of liability coverage or funds assured				
	264.150	-	Documentation of State Assumed Responsibility for Closure Post-Closure or Liability including				
			- Letter from State describing State's responsibilities				
			- Facility EPA I.D. number				
			- Facility name				
			- Facility address				
			- Amounts of liability coverage or funds assured				
270.14(b) (19)		-	Topographic map showing a distance of 1000 feet around facility at a scale of not more than 1 inch equals 200 feet that clearly shows				
			- Contours				
			- Proper contour intervals				
			- Map scale and date				
			- 100-year flood plain area				
			- Surface waters and intermittent streams				
			- Surrounding land uses				

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.14(b)(19)		- Wind rose				
		- North orientation				
		- Legal boundaries of facility site				
		- Access control				
		- Injection and withdrawal wells onsite and offsite				
		- Buildings and recreation areas				
		- Runoff control systems				
		- Access and internal roads				
		- Storm, sanitary, and process sewerage systems				
		- Loading and unloading areas				
		- Fire control facilities				
		- Barriers for drainage or flood control				
		- Location of past or present operational units and equipment cleanup areas				
270.17		Specific Part B Information Requirements for Surface Impoundments				
270.17(a)		- List of hazardous wastes placed or to be placed in impoundment				
270.17(b)	264.221	- Detailed plans and an engineering report describing				
270.17(b)(1)	264.221(a)	- Liner system construction (new only)				
	264.221(a)(1)	- Material of construction				
		- Chemical properties				

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.17(b)(1)		- Physical strength				
		- Thickness				
	264.221(a)(2)	- Foundation design/integrity				
	264.221(a)(3)	- Area covered				
	264.221(a)(1)	- Liner system integrity against (new only)				
		- Internal and external pressure gradients				
		- Contact with waste/leachate				
		- Climatic conditions				
		- Installation stresses				
		- Daily operational stresses				
	264.221(b)	- Liner system exemption including				
		- Nature and quantity of wastes				
		- Alternative design and operation				
		- Impoundment location description				
		- Hydrogeologic setting				
		- Attenuative capacity of materials between impoundment and groundwater and surface water				
		- Documentation of no migration to ground/surface waters at any future time				
270.17(b)(2)	264.221(c)	- Procedures/equipment to prevent overtopping from				
		- Normal operation				

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.17(b)(2)	264.221(c)	- Abnormal operation				
		- Overfilling				
		- Wind/wave action				
		- Rainfall				
		- Run-on				
		- Equipment malfunctions				
		- Human error				
270.17(b)(3)	264.221(d)	- Structural integrity of dikes				
270.17(c)	264.222(a)	- Documentation for Part 264, Subpart F exemption including,				
		- Impoundment and liner location above seasonal high water table				
		- Two liners meeting §264.221(a) requirements				
		- Leak detection system between liners				
270.18		- Specific Part B Information Requirements for Waste Piles				
270.18(a)		- List of hazardous wastes placed or to be placed in each waste pile				
270.18(b)	264.250(c)	- Documentation of general exemption from §264.251 and Part 264, Subpart F, including,				
		- Waste pile protection from precipitation				
		- Procedures for ensuring liquids are not placed in pile				
		- Description of run-on control.				

Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
		- Description of wind dispersal controls other than wetting				
		- Decomposition/reactions do not cause leachate generation				
270.18(c)	264.251(a)	- Detailed plans and an engineering report describing,				
270.18(c)(1)	264.251(a)(1)	- Liner system construction (new only)				
	264.221(a)	- Material of construction				
		- Chemical properties				
		- Physical strength				
		- Thickness				
		- Foundation design/integrity				
		- Area covered				
		- Liner system integrity against (new only)				
		- Internal and external pressure gradients				
		- Contact with waste/leachate				
		- Climatic conditions				
		- Installation stresses				
		- Daily operational stresses				
	264.251(a)(2)	- Leachate collection and removal system to maintain less than one foot of leachate on liner including,				
		- Materials of construction				

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.18(c)(1)		- Chemical resistance to waste/leachate	____	____	____	____
		- Strength sufficient to prevent collapse	____	____	____	____
		- Provisions to prevent clogging	____	____	____	____
	264.251(b)	- Liner system/leachate system exemption including,	____	____	____	____
		- Nature and quantity of wastes	____	____	____	____
		- Alternative design and operation	____	____	____	____
		- Pile location description	____	____	____	____
		- Hydrogeologic setting	____	____	____	____
		- Attenuative capacity of materials between pile, ground and surface waters	____	____	____	____
		- Documentation of no migration to ground/surface waters at any future time	____	____	____	____
270.18(c)(2)	264.251(c)	- System for control of run-on from peak discharge of a 25-year storm	____	____	____	____
270.18(c)(3)	264.251(d)	- System for control of run-off water volume of a 24-hour, 25-year storm	____	____	____	____
270.18(c)(4)	264.251(e)	- Procedures to manage collection and holding facilities associated with run-on and run-off control systems	____	____	____	____
270.18(c)(5)	264.251(f)	- Wind dispersal control procedures	____	____	____	____
270.18(d)	264.252(a)	- Documentation for Part 264, Subpart F exemption including,	____	____	____	____
		- Pile and liners above seasonal high water table	____	____	____	____

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.18(d)		- Two liners meeting requirements of §264.251(a)(1)				
		- Leak detection system between liners				
		- Leachate system meeting §264.251(a)(2) requirements				
	264.253(b)	- Documentation for Part 264, Subpart L exemption including,				
		- Pile and liners above seasonal high water table				
		- Liner meets §264.251(a)(1) requirements				
		- Soil characteristics/depths				
		- Leachate system meets §264.251(a)(2) requirements				
		- Schedule/procedures for liner inspection by waste removal				
		- Sufficient liner strength/thickness to allow periodic removal/replacement of wastes				
270.18(e)		- Description of treatment carried out in or on the pile including,				
		- Details of treatment process				
		- Equipment used				
		- Nature and quality of residuals				
270.20		- Specific Part B Information Requirements for Land Treatment Facilities				
270.20(a)		- Description of treatment demonstration plans by				
	264.272(b)	- Field test				

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.20(a)		- Laboratory analysis				
		- Available data				
		- Operating data (existing units only)				
		- Submittal for laboratory analyses or field test demonstration permit including,				
	264.272(c)	- Documentation of accurate simulation				
		- Wastes and hazardous constituents descriptions (Part 261, Appendix VIII)				
		- Climatologic information'				
		- Topographical data				
		- Operating practices				
		- Type of test to be conducted				
		- Test materials and methods				
		- Expected completion time				
		- Statement on appropriateness of demonstration				
		- Statement on human health and environment protection considering,				
		- Characteristics of wastes to be tested				
		- Operating and monitoring during tests				
		- Duration of test				
		- Volume of waste used in test				

Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
		- Potential for hazardous waste migration to ground/surface waters (field tests only)				
270.20(b)	264.271(a)	- Description of land treatment program				
		- Wastes to be land treated				
		- Design measures to maximize treatment including,				
270.20(b)(2)(i)	264.273(a)	- Rate and method of waste application				
		- Soil pH control measures				
		- Microbial/chemical reaction enhancements				
		- Treatment zone moisture control measures				
270.20(b)(3)	264.278 (a)-(f)	- Unsaturated zone monitoring procedures including,				
		- List of and rational for selecting compounds to be monitored				
		- Monitoring equipment, procedures, frequency				
		- Procedures for selecting sampling locations				
		- Sample collection procedures				
		- Sample preservation/shipment procedure.				
		- Sample chain of custody control				
		- Sample analysis procedures				

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
		- Background value determination procedures	______	______	______	______
		- Statistical methods description	______	______	______	______
270.20(b)(4)		- List of hazardous constituents expected to be in, or derived from, wastes to be land treated	______	______	______	______
270.20(b)(5)	264.271(c)	- The proposed vertical and horizontal dimensions of the treatment zone with maximum depth of	______	______	______	______
		- No more than 5 feet from the initial soil surface	______	______	______	______
		- More than 3 feet above the seasonal high water table	______	______	______	______
270.20(c)	264.273 (b)-(f)	- Description of land treatment unit design	______	______	______	______
		- Procedures/equipment to prevent run-on from peak discharge of 25-year storm	______	______	______	______
		- Procedures/equipment to collect and control the run off water volume from a 24-hour, 25-year storm	______	______	______	______
		- Procedures/equipment to minimize run-off from treatment zone during active life	______	______	______	______
		- Run-on and run-off collection and control systems management plan	______	______	______	______
		- Procedures/equipment for wind dispersal control	______	______	______	______
270.20(d)	264.276(a)	- Documentation of request for growth of food-chain crops on treatment zone not receiving cadmium in wastes	______	______	______	______

Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.20(d)	264.276(a)	- Statement that demonstration of no risk to human health will be conducted by,	______	______	______	______
		- Field tests	______	______	______	______
		- Greenhouse studies	______	______	______	______
		- Available data	______	______	______	______
		- Operating data (existing only)	______	______	______	______
		- Demonstration program description, including	______	______	______	______
		- Soil pH	______	______	______	______
		- Cation exchange capacity of soil	______	______	______	______
		- Specific wastes to be applied	______	______	______	______
		- Waste application rates	______	______	______	______
		- Waste application methods	______	______	______	______
		- Identification of demonstration crops	______	______	______	______
		- Planting and growth procedures	______	______	______	______
		- Characteristics of crop	______	______	______	______
		- Sample selection criteria	______	______	______	______
		- Sample collection procedure	______	______	______	______
		- Sample size	______	______	______	______
		- Analyses methods	______	______	______	______
		- Statistical data evaluation procedures	______	______	______	______
		- Identification of comparison crops	______	______	______	______
		- Characteristics of crop	______	______	______	______

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.20(d)	264.276(a)	- Planting and growth procedures				
		- Conditions of growth				
		- Sample selection criteria				
		- Sample collection procedures				
		- Sample size				
		- Analyses methods				
		- Statistical data evaluation procedures				
		- Request for a permit to conduct demonstration program				
270.20(e)	264.276(b)	- Documentation of request for growth of food-chain crops on treatment zone if wastes contain cadmium				
		- Cadmium concentration in waste				
		- Soil pH				
		- Annual application of cadmium in kilograms per hectare				
		- Soil cation exchange capacity				
		- Identification of animal feeds to be grown				
		- Plan to prevent animal feed ingestion by humans				
		- Documentation of notice on deed				
270.21		- Specific Part B Information Requirements for Landfills				
270.21(a)		- List of hazardous wastes to be placed in each landfill cell				

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.21(b)	264.301(a)	- Detailed plans and an engineering report describing				
270.21(b)(1)	264.301(a)(1)	- Liner system construction (new only)				
		- Material of construction				
		- Chemical properties				
		- Physical strength				
		- Thickness				
		- Foundation design/integrity				
		- Area covered				
		- Liner system integrity against (new only)				
		- Internal and external pressure gradients				
		- Contact with waste/leachate				
		- Climatic conditions				
		- Installation stresses				
		- Daily operational stresses				
	264.301(a)(2)	- Leachate collection and removal system to maintain less than one foot of leachate on liner including,				
		- Materials of construction				
		- Chemical resistance to waste/leachate				
		- Sufficient strength to prevent collapse				

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.21(b)(1)		- Provisions to prevent clogging				
	264.301(b)	- Liner system/leachate system exemption including,				
		- Nature and quantity of wastes				
		- Alternative design and operation				
		- Landfill location description				
		- Hydrogeologic setting				
		- Attenuative capacity of materials between landfill and ground and surface waters				
		- Demonstration of no migration to ground/surface waters at any future time				
270.21(b)(2)	264.301(c)	- System for control of run-on from peak discharge of a 25-year storm				
270.21(b)(3)	264.301(d)	- System for control of run-off water volume from a 24-hour, 25-year storm				
270.21(b)(4)	264.301(e)	- Procedures to manage collection and holding facilities associated with run-on and run-off control systems				
270.21(b)(5)	264.301(f)	- Wind dispersal control procedures				
270.21(c)	264.302(a)	- Documentation for Part 264, Subpart F exemption including,				
		- Landfill and liners above seasonal high water table				
		- Two liners meeting requirements of §264.301(a)(1)				

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
		- Leak detection system between liners				
		- Leachate system meeting §264.301(a)(2) requirements				
270.21(h)	264.314	- Documentation of procedures/equipment for landfilling liquid wastes				
270.21(i)	264.315	- Documentation of procedures/equipment for landfilling containers				
270.14(c)	Part 264 Subpart F	Part B Protection of Ground Water Information Requirements for Surface Impoundments, Waste Piles, Land Treatment Units, and Landfills				
270.14(c)(1)		- Interim status period ground-water monitoring data summary				
270.14(c)(2)		- Identification of uppermost and hydraulically interconnected aquifers under facility including,				
		- Water flow rate and direction				
		- Basis for identification				
270.14(c)(3) and 270.14(b)(19)		- Topographic map				
		- Delineation of property boundary				
	264.95(b)	- Delineation of waste management area				
	264.95(a)	- Delineation of proposed point of compliance				
		- Ground-water monitoring well locations				
		- Location of aquifers				
270.14(c)(4)		- Descriptions of existing contamination				
		- Delineation of plume extent				

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
		- Appendix VIII constituents concentrations				
		- Concentrations throughout plume				
		- Maximum concentrations in plume				
270.14(c)(5)	264.97	- Detailed plans and an engineering report of Ground Water Monitoring Program				
	264.97(a)	- Descripton of wells				
		- Number of wells				
		- Locations				
		- Depths				
		- Assurance of unaffected background water measurement				
		- Assurance of compliance point ground water measurement				
	264.97(c)	- Casing description				
	264.97(d)	- Description of sampling/analysis procedures				
		- Sample collection methods				
		- Sample preservation/shipment				
		- Analytical procedures				
		- Chain of custody control				
	264.97(e)	- Documentation of proper/adequate analytical procedures				
	264.97(f)	- Procedure for determination of ground water elevation with each sample				
270.14(c)(6)	264.91(a)(4) and 264.98	- Description of Detection Monitoring Program including.				

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.14(c)(6)(i)	264.93 and 264.98(a)	- List of indicator parameters, waste constituents, reaction products to be monitored for, including				
		- Type, quantities, concentrations expected in wastes				
		- Mobility, stability, persistence in unsaturated zone				
		- Detectability in ground-water				
270.14(c)(6)(iii)	264.98(a)(4) and 264.98(c)(1)	- Background ground-water concentration values and coefficients of variation established by				
	264.98(c)(3)	- Use of an appropriate ground water monitoring system, and				
	264.97(g)(1)	- Quarterly sampling of upgradient wells for one year, or				
	264.97(g)(3)	- Quarterly sampling of other wells for one year, and				
	264.97(g)(4)	- Data from a minimum of one sample/well and minimum of four samples per quarter, or				
		- Presentation of procedures to calculate such values				
270.14(c)(6)(ii)	264.98(b)	- Description of an appropriate ground-water monitoring system to be installed at the compliance point				
270.14(c)(6)(iv)	264.98(d)	- Procedures for collecting semi-annual ground water samples at the compliance point during				
		- Active life				
		- Closure period				

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
		- Post-closure period				
	264.98(e)	- Procedure for annual determination of uppermost aquifer flow rate and direction				
	264.98(f) & 264.97(d)&(e)	- Documentation of sample collection and analysis procedures				
	264.98(g)	- Procedure for determining a statistically significant increase for any monitored parameter or constituent by				
		- Comparing compliance point data to background value data using the procedure in §264.97(h)(1) or (2), and				
		- Providing an estimate of the time period after sampling completion necessary to obtain results				
270.14(c)(6)	264.98(h)	- Procedure to be implemented if a statistically significant increase in any constituent or parameter is identified at any compliance point monitoring well, including				
	264.98(h)(1)	- Written notification to Regional Administrator				
	264.98(h)(2)	- Sample collection and analysis methods for all Appendix VIII constituents at all monitoring wells				
	264.98(h)(3)	- Method for establishing Appendix VIII constituent background values				
	264.98(h)(4)	- Preparation of an application for permit modification to establish compliance monitoring				

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.14(c)(7)	264.91(a)(1) and 264.99	- Description of Compliance Monitoring Program, including				
		- List of wastes previously handled at facility				
		- Characterization of contaminated ground-water				
		- Hazardous constituents identified				
		- Hazardous constituents concentrations				
	264.99(b)	- Description of compliance monitoring system at the compliance point				
		- List of hazardous constituents to be compliance monitored				
	264.96	- Proposed compliance period				
	264.99(d)	- Procedure for collecting quarterly samples at compliance point during compliance period				
	264.99(c)(3)	- Procedures for establishing background concentration values for constituents that are based on				
		- Use of an appropriate ground-water monitoring system, and				
	264.97(g)	- Data that is available prior to permit issuance				
		- Data that accounts for measurement errors in sampling and analysis				
		- Data that accounts for seasonal ground-water quality fluctuations				
		- Data from a minimum of one sample per well and a minimum of four samples from monitoring system, each time system is sampled				

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Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
270.14(c)(7)(iv)	264.92 and 264.99(c)(1),(2)	- Proposed concentration limits for constituents with justification based on				
		- §264.94(a)(1) and §264.97(g)				
		- §264.94(a)(2)				
		- §264.94(b) and §264.99(c)(1)				
	264.99(e)	- Procedure for annual determination of uppermost aquifer flow rate and direction				
	264.99(f)	- Procedures for annual testing of all compliance point wells for Appendix VIII constituents				
	264.99(g)	- Documentation of all sampling and analysis procedures				
	264.99(h)	- Procedures for determining a statistically significant increase for any monitored constituent by				
		- Comparing compliance point data to the concentration limit using the procedure in §264.97(h)(2)				
		- Providing an estimate of the time period after sampling completion necessary to obtain results				
	264.99(i)	- Procedures to be implemented if the ground-water protection standard is exceeded at any compliance point monitoring well, including				
	264.99(i)(1)	- Written notification to Regional Administrator				
	264.99(i)(2)	- Preparation of an application for permit modification to establish a corrective action program, including				

Part 270	Part 264	Subject Requirement	Provided	Not Applicable	Location in Application	Comments
		- Details of program to comply with ground-water protection standard	____	____	____	____
270.14(c)(7)(v)	264.99(i)(2)(ii)	- Details of ground-water monitoring to demonstrate effectiveness of program	____	____	____	____
270.14(c)(8)	264.91(a)(2) and 264.100	- Description of Corrective Action Program, including	____	____	____	____
270.14(c)(8)(i)		- Characterization of contaminated ground-water	____	____	____	____
	264.100(a)(1)	- Identified hazardous constituents	____	____	____	____
		- Concentrations of hazardous constituents	____	____	____	____
270.14(c)(8)(ii)	264.100(a)(2)	- Concentration limit for each hazardous constituent	____	____	____	____
270.14(c)(8)(iii)	264.100(b)	- Detailed plan and an engineering report describing the corrective actions to be taken at the compliance point	____	____	____	____
	264.100(c)	- Time period necessary to implement corrective action program	____	____	____	____
270.14(c)(8)(iv)	264.100(d)	- Description of ground-water monitoring program that will be sufficient to assess the adequacy of corrective action	____	____	____	____
	264.91(a)(3) and 264.100(e)	- Description of the corrective action to be taken for constituents in ground-water between compliance point and downgradient facility boundary	____	____	____	____
	264.100(g)	- Procedure and content for semi-annually submitting written reports to the Regional Administrator on program effectiveness	____	____	____	____
		Part B Certification and Signatories				
270.11(d)		- Certification paragraph	____	____		
270.11(a)		- Appropriate signatory	____	____		

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APPENDIX A

FEDERAL AND STATE AGENCY
ADDRESSES AND TELEPHONE NUMBERS

A.1 RCRA HOTLINE

A.2 GOVERNMENT PRINTING OFFICE (GPO)

A.3 EPA REGIONAL OFFICES

A.4 STATE AGENCIES

A.5 GPO BOOKSTORE LOCATIONS

A.1 RCRA HOTLINE: (800) 424-9346

Hours: Monday - Friday
8:00 a.m. - 4:30 p.m. EST or EDT

A.2 MAILING ADDRESS: Superintendant of Documents
Governmental Printing Office
Washington, D.C. 20402

Telephone: (202) 783-3238

Ordering Procedure:

- Payment in advance is required for shipment of regulations. Do not send currency (bills and coins) or postage stamps.

- Make checks or money orders payable to the Superintendant of Documents.

- If first-class mailing is desired, contact GPO at the above telephone number - it costs more.

- To order any document, obtain a Governmental Printing Office order form #1981-0-346-379/1307. These are available through any GPO bookstore or by contacting the Superintendant's office.

- Type or print:
  - Office/Home Telephone Number
  - Visa or MasterCard Number (if applicable)
  - Deposit Account Number (if applicable)
  - Date of Order
  - Order Number (if any)
  - Complete Name and Address
  - Stock Number
  - Quantity
  - Unit of Issue
  - Title
  - Price
  - Payment Enclosed
  - Shipping Address (if different from other)

- For information on publications, or for placing a Deposit Account or Visa or MasterCard order, call the above telephone number.

- Mail completed form to the above address.

A.3 REGIONAL EPA OFFICE BRANCHES WHO ADMINISTER THE RCRA

Region I:
State Waste Programs Branch
Waste Management Division
John F. Kennedy Federal Building
Boston, MA 02203
(617) 223-6883

Region II:
Solid Waste Branch
Air and Waste Management Division
26 Federal Plaza
New York, NY 10007
(212) 264-0505

Region III:
Waste Management Branch/RCRA Permit Section
Air and Waste Management Division
Curtis Building, 6th and Walnut Streets
Philadelphia, PA 19106
(215) 597-9118

Region IV:
Residuals Management Branch
Air and Waste Management Division
345 Courtland Street, N.E.
Atlanta, GA 30308
(404) 881-3443

Region V:
Waste Management Branch
Waste Management Division
Federal Building, 230 South Dearborn
Chicago, IL 60604
(312) 886-7579

Region VI:
Hazardous Materials Branch
Air and Waste Management Division
First International Building, 1201 Elm Street
Dallas, TX 73270
(214) 729-2645

Region VII:
Waste Management Branch
Air and Waste Management Division
324 East 11th Street
Kansas City, MO 64106
(816) 374-6531

Region VIII:
Waste Management Branch
Air and Waste Management Division
Suite 900, 1860 Lincoln Street
Denver, CO 80203
(303) 837-6238

Region IX: Programs Branch
Toxics and Waste Management Division
215 Fremont Street
San Francisco, CA
(415) 974-7411/974-8391

Region X: RCRA Branch
Air and Waste Management Division
1200 6th Avenue
Seattle, WA 98101
(206) 399-2782

A.4 STATE AGENCIES DEALING WITH HAZARDOUS WASTES

Alabama
Environmental Health Administration
Solid and Hazardous Waste Division
328 State Office Building
Montgomery, AL 36130
(205) 834-1303

Alaska
Department of Environmental Conservation
Environmental Quality Management Section
Solid Waste Management Section
Pouch O
Juneau, Alaska 99811
(907) 465-2667

Arizona
Department of Health Services
Division of Environmental Health Services
Bureau of Waste Management
1740 West Adams
Phoenix, AZ 85007
(602) 255-1170

Arkansas
Department of Pollution Control and Ecology
Solid Waste Division
P.O. Box 9583
Little Rock, Arkansas 72219
(916) 562-7444

California
Solid Waste Management Board
1020 9th Street, Suite 300
Sacramento, CA 95841
(916) 322-3330

Colorado
Department of Health
Office of Health and Environmental Protection
4210 East 11th Avenue
Denver, CO 80220
(303) 320-8333

Connecticut
Department of Environmental Protection
Division of Environmental Quality
Solid Waste Management Unit
State Office Building
165 Capitol Avenue
Harford, CN 06115
(203) 566-5847

Delaware
Department of Natural Resources and Environmental Control
Division of Environmental Control
Solid Waste/Hazardous Waste Section
Edward Tatnall Building
P.O. Box 1401
Dover, Delaware 19901
(302) 736-4781

District of Columbia
Department of Environmental Services
Solid Waste Management Administration/
Hazardous Waste Division
500 Overlook Avenue, S.W.
Washington, D.C. 20032
(202) 767-8176/767-8422

Florida
Department of Environmental Regulation
Division of Environmental Programs
2600 Blairstone Road
Tallahassee, FL 32301
(904) 487-1855

Georgia
Department of Natural Resources
Environmental Protection Division
Land Protection Branch
270 Washington Street, S.W.
Atlanta, GA 30334
(404) 656-2833

Hawaii
Department of Health
Environmental Protection and Health Services Division
P.O. Box 3378
1250 Punchbowl Street
Honolulu, HI 96801
(808) 548-4139

Idaho
Department of Health and Welfare
Division of Environment
Statehouse
Boise, Idaho 83720
(208) 334-4059

Illinois
Environmental Protection Agency
Land Pollution Control Division
2200 Churchill Road
Springfield, IL 62706
(217) 782-6760

Indiana
Environmental Management Board
P.O. Box 1964
1330 Michigan Street
Indianapolis, IN 46206
(317) 633-0170

Iowa
Department of Environmental Quality
Air and Land Quality Division
Henry A. Wallace Building
900 East Grand Avenue
Des Moines, Iowa 50319
(515) 281-5851

Kansas
Department of Health and Environment
Solid Waste Management Division
740 Forbes Building
Topeka, KS 66620
(913) 862-9360

Kentucky
Bureau of Environmental Protection
Waste Management Division
Fort Boone Plaza
18 Reilly Road
Frankfort, Kentucky 40601
(502) 564-6716

Louisiana
Department of Natural Resources
Solid Waste/Hazardous Waste Division
P.O. Box 44066
Baton Rouge, Louisiana 70804
(504) 342-1216/342-1227

Maine
Department of Environmental Protection
Solid Waste/Hazardous Materials Division
State House, Station 17
Augusta, ME 04333
(207) 289-2111/289-2251

Maryland
Department of Health and Mental Hygiene
Waste Management Division
201 West Preston Street
Baltimore, Maryland 21201
(301) 383-3123

Massachusetts
Executive Office of Environmental Affairs
Department of Environmental Quality Engineering
Solid and Hazardous Waste Division
One Winter Street
Boston, MA 02108
(617) 292-5589

Michigan
Bureau of Environmental Protection
Hazardous Waste Management Office
P.O. Box 30028
Lansing, Michigan 48909
(517) 373-8114

Minnesota
Health Department
Environmental Health Division
717 Delaware Street SE
Minneapolis, Minnesota 55440
(612) 296-5320

Mississippi
Department of Natural Resources
Bureau of Pollution Control
P.O. Box 10385
Jackson, MS 39209
(601) 961-5202

Missouri
Department of Natural Resources
Division Of Environmental Quality
Solid Waste Management Program
P.O. Box 1368
Missouri Boulevard
Jefferson City, Missouri 65102
(314) 751-3241

Montana
Department of Health and Environmental Sciences
Environmental Sciences Division
Solid Waste Management Bureau
Cogswell Building
Helena, Montana 59620
(406) 449-2821

Nebraska
Department of Environmental Control
P.O. Box 94877
State Office Building
Lincoln, Nebraska 68509
(402) 471-2186

Nevada
Department of Conservation and Natural Resources
Division of Environmental Protection
201 South Fall Street, Capitol Complex
Carson City, Nevada 89710
(702) 885-4670

New Hampshire

Department of Health and Welfare
Bureau of Solid Waste Management/
Hazardous Waste Management
Hazen Drive
Concord, NH 03301
(603) 271-4586/271-4608

New Jersey

Department of Environmental Protection
Solid Waste Division/Hazardous Waste Bureau
CN 402
Trenton, NJ 08625
(609) 292-9120/292-9877

New Mexico

Health and Environmental Department
Environmental Improvement Division
P.O. Box 968
Santa Fe, NM 87503
(505) 827-5271

New York

Department of Environmental Conservation
Solid Waste Management Division/
Bureau of Hazardous Waste
50 Wolf Road
Albany, NY 12233
(518) 457-5861/457-3254

North Carolina

Department of Human Resources
Division of Health Services
Solid and Hazardous Waste Management Branch
P.O. Box 2091
225 North McDowell Street
Raleigh, North Carolina 27602
(919) 733-2178

North Dakota

Health Department
Environmental and Waste Management Research Division
1200 Missouri Avenue
Bismarck, North Dakota 58505
(701) 224-2382

Ohio

Environmental Protection Agency
Office of Land Pollution Control
P.O. Box 1049
361 East Broad Street
Columbus, Ohio 43216
(614) 466-8934

Oklahoma

Health Department
Environmental Health Services
Industrial and Solid Waste Service
1000 NE 10th Street
Oklahoma City, OK 73152
(405) 271-5338

Oregon
Department of Environmental Quality
Solid Waste Division
522 SW 5th Street
Portland, OR 97204
(503) 229-5336

Pennsylvania
Department of Environmental Resources
Office of Environmental Protection
Bureau of Solid Waste Management
Fulton Building, P.O. Box 2063
Harrisburg, PA 17120
(717) 787-9870

Rhode Island
Department of Environmental Management
Division of Land Resources
75 Davis Street
Providence, RI 02908
(401) 277-6820

South Carolina
Board of Health and Environmental Control
Bureau of Solid and Hazardous Waste
2600 Bull Street
Columbia, SC 29201
(803) 758-5544

South Dakota
Department of Water and Natural Resources
Environmental Health Division
Joe Foss Building
Pierre, SD 57501
(605) 773-3329

Tennessee
Department of Public Health
Bureau of Environmental Health Services
Solid Waste Management Division
Cordell Hull Building
Nashville, TN 37129
(615) 741-3424

Texas
Department of Health
Bureau of Solid Waste
(512) 458-7271

Utah
Department of Health
Division of Environmental Health
Bureau of Solid Waste Management
150 North Temple Street
P.O. Box 2500
Salt Lake City, UT 84110
(801) 533-4145

Vermont
Environmental Conservation Agency
Air and Solid Waste Division
State Office Building
Montpelier, VT 05602
(802) 828-3395

Virginia
Department of Health
Division of Solid and Hazardous Waste Management
109 Governor Street
Richmond, VA 23219
(804) 786-5271

Washington
Department of Ecology
Solid Waste Management Division/Hazardous Waste Section
P.O. Box 829
Olympia, WA 98501
(206) 459-6273/459-6301

West Virginia
Department of Health
Office of Environmental Health
1800 Washington Street East
Charleston, WV 25305
(304) 348-2987

Wisconsin
Department of Natural Resources
Bureau of Solid Waste Management
101 South Webster Street
Madison, Wisconsin 53707
(609) 266-1327

Wyoming
Environmental Quality
Solid Waste Management Program
401 West 19th Street
Cheyenne, Wyoming 82002
(307) 777-7753

A.5 GOVERNMENT PRINTING OFFICE BOOKSTORE LOCATIONS

Region I
Boston, MA
John F. Kennedy Federal Building
Sudbury Street
(617) 223-6071

Region II
New York, NY
20 Federal Plaza
(212) 264-3825

Region III
Philadelphia, PA
Federal Office Building
600 Arch Street
(215) 597-0677

Los Angeles, CA
ARCO Plaza
505 S. Flower Street
(213) 688-5841

Region X

Seattle, WA
Federal Office Building
915 Second Avenue
(206) 442-4270

APPENDIX B

SYNOPSIS OF TECHNICAL REPORTS

B.1 SYNOPSIS OF TECHNICAL GUIDANCE DOCUMENTS

B.2 SYNOPSIS OF TECHNICAL RESOURCE DOCUMENTS

B.3 SYNOPSIS OF OTHER GUIDANCE MANUALS

B.1 SYNOPSIS OF TECHNICAL GUIDANCE DOCUMENTS

(1) Surface Impoundments Liner Systems, Final Cover, and Freeboard Control discusses design specifications for the principal components of surface impoundments (i.e., liner systems, monitoring methods, overtopping controls, and closure caps). Appendices are included that provide laboratory and field testing protocols for obtaining necessary data elements.

(2) Waste Pile Design - Liner Systems describes liner designs that provide an essentially impermeable waste pile base of sufficient strength to allow periodic removal of all wastes in order to physically inspect the base liner. Details such as suitable liner materials, liner thickness, and leachate processing are discussed. Appendices with useful test procedures are included.

(3) Land Treatment Units identifies specific designs and various operating procedures to: maximize waste treatment; control water run-on/run-off and wind dispersal; monitor for waste constituent escape; close facility; and maintain the site after closure. Methods to demonstrate waste treatability in soil are provided along with appendices containing testing protocols.

(4) Landfill Design - Liner Systems and Final Cover presents various liner specifications, leachate processing methods, and final cover designs that would give satisfactory performance in a given environmental setting. Appendices containing relevant testing procedures are included.

B.2 SYNOPSIS OF TECHNICAL RESOURCE DOCUMENTS

(1) Evaluating Cover Systems for Solid and Hazardous Waste (SW-867) presents a procedure for evaluating final cover engineering plans proposed for solid and hazardous waste land disposal facilities. All aspects of cover design are addressed in sufficient detail to allow a complete evaluation of the entire cover system.

(2) Hydrologic Simulation on Solid Waste Disposal Sites (SW-868) describes the use of a computer-based model for simulating the percolation of water through cover material at a solid waste disposal site. This model is a tool for evaluating present cover materials, and the design of new landfill covers. Previous computer experience by the program user is not necessary.

(3) Landfill and Surface Impoundment Performance Evaluation (SW-869) provides techniques for determining the adequacy of design features such as liners, drain layers, slope, and position of drains in controlling liquid waste escape from surface impoundments and landfills into the environment.

(4) Lining of Waste Impoundment and Disposal Facilities (SW-870) discusses performance evaluation, selection, installation, and maintenance of specific liner and cover materials for certain containment situations based upon the latest technology. It includes a description of several industrial waste streams, and indicates several testing procedures for evaluating the waste/liner interaction.

(5) Management of Hazardous Waste Leachate (SW-871) presents options for controlling, treating, and disposing of hazardous waste leachates generated by surface impoundments and landfills. Discussion includes factors that influence leachate generation, data on leachate characteristics, alternative technologies for processing leachates, and data on treatment costs and byproducts. A systematic approach is provided for selecting an appropriate leachate management method.

(6) Guide to the Disposal of Chemically Stabilized and Solidified Waste (SW-872) describes current treatment technology, and design of long-term storage and disposal systems using stabilization/solidification of wastes. In includes data on the properties of treated wastes, and a listing of major technology suppliers with a summary of each process. Sufficient information is provided to determine relative cost/effectiveness of stabilization/solidification for a particular waste and disposal system.

(7) Closure of Hazardous Waste Surface Impoundments (SW-873) discusses the important details to consider in evaluating closure and post-closure plans for hazardous waste surface impoundments. Methodologies are presented for site specific assessments.

(8) Hazardous Waste Land Treatment (SW-874) describes current technology and provides methods for evaluating the design and performance of hazardous waste land treatment facilities. All aspects of land treatment are discussed from initial site selection through final closure.

FUTURE TECHNICAL RESOURCE DOCUMENTS

(9) Evaluation of Closure and Post-Closure Care Plans for Hazardous Waste Landfills presents an overview of the current state-of-the-art technologies for closing landfill facilities. (Due in early 1984.)

(10) Soil Properties, Classification, and Hydraulic Conductivity Testing is a compilation of available laboratory and field testing methods for the measurement of hydraulic conductivity of soils along with background information on relevant soil properties and classification systems. (Due in early 1984.) However, the RCRA Technical Guidance Documents present the official EPA test methods for hydraulic conductivity determinations.

(11) Solid Waste Leaching Procedure Manual provides laboratory batch procedures for extracting a leachate sample from solid waste that is similar to the composition of leachate from the waste under field conditions. (Due in early 1984.)

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3.3 SYNOPSIS OF OTHER GUIDANCE MANUALS

(1) Test Methods for Evaluating Solid Wastes (SW-846) provides standardized laboratory procedures for determining whether a waste is hazardous as defined in Section 3001 of the Resource Conservation and Reocvery Act (PL94-580), and for obtaining data to satisfy the requirement of 40 CFR Part 261, Identification and Listing of Hazardous Waste. These methods will generate data of acceptable quality to support waste evaluation and listing/delisting petitions. Included are protocols for collecting representative waste samples, determining pH, flash point, leachability, reactivity, corrosivity, ignitability, mobility of toxic constituents, and general composition of the waste. These procedures are current state-of-the-art techniques and will be periodically updated and expanded as new information is developed.

(2) A Method for Determining the Compatibility of Hazardous Wastes (EPA-600/2-80-076) presents a procedure for determining the compatibility of combinations of two wastes or waste streams. The manual includes a chart of 41 reactivity groups. Wastes to be combined are first subjected to the analysis procedure for identification and classification into a reactive group. The chart is used to predict the compatibility of the classified wastes on mixing.

(3) Handbook for Remedial Action at Waste Disposal Sites (EPA-625/6-82-006) describes available remedial action technologies and how they may be applied for the clean-up of hazardous waste disposal sites. A general approach to selecting an appropriate clean-up technique for a specific site is provided.

(4) Permit Writer's Guidance Manual for Subpart F (being drafted) provides a comprehensive examination of items covering ground-water protection requirements for permit writers to examine when reviewing Part B applications.

(5) Ground-Water Monitoring Guidance for Owners and Operators of Interim Status Facilities (SW-963) provides guidance for facilities in compliance with the Interim Status requirements.

(6) Financial Assurance for Closure and Post-Closure Care: Requirements for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities - A Guidance Manual (SW-955) describes the responsibilities of the regulated community in fulfilling the financial assurance requirements of the regulations. Tasks that must be performed by the Regional Office, and possible contingencies that may arise are discussed. A checklist of required information and sample application forms are provided.

(7) Liability Coverage: Requirements for Owners or Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities - A Guidance Manual (SW-961) describes the responsibilities of the regulated community in providing liability coverage for facilities, and discusses the role of the Regional Office. Included are a checklist of required information and sample application forms.

FUTURE RESOURCE MANUALS

Work is in progress on technical resource manuals in the following subject areas:

- numerical simulation techniques for design of soil liners for storage impoundments and waste piles
- further information on the compatibility of soil liners and hazardous wastes
- characteristics of hazardous waste streams

The availability of these manuals will be announced in the Federal Register, and in future editions of this Manual.

APPENDIX C

ADDRESSES OF GEOLOGICAL AGENCIES

Geological agencies are located throughout the United States, in the form of Federal agencies (U.S. Geological Survey), state geological surveys, and district branches of USGS. The Federal USGS offices fall within the U.S. Department of the Interior. This Appendix provides direction to the reader on the Federal level only. This is due to several factors, the most important being that the Federal USGS can provide up-to-date state and district office addresses and telephone numbers. Thus, the two distribution offices of the USGS (east and west) are listed here along with the 10 Public Inquiries Offices (PIO's) spread throughout the country. Both can provide services and maps; specific functions are noted in this Appendix.

The two distribution offices of the Federal U.S. Geological Survey are for areas east of the Mississippi River, including Minnesota, Puerto Rico, and the Virgin Islands:

- Eastern Distribution Branch
  U.S. Geological Survey
  1200 South Eads Street
  Arlington, Virginia 22202

and for areas west of the Mississippi River, including Alaska, Hawaii, Louisiana, Guam, and American Samoa:

- Western Distribution Branch
  U.S. Geological Survey
  Box 25286 Denver Federal Center
  Denver, Colorado 80225

These offices can provide indexes which list all published maps and include order blanks, prices, and detailed ordering instructions. They also list addresses of local map reference libraries, local map dealers, and Federal map distribution centers. You should use these addresses for obtaining topographic and other maps through the mail.

Public inquiries offices of the USGS are provided in Table C-1. These offices can also provide index maps and sell topographic maps over the counter. They can ship geologic maps through the mail for nearby states.

TABLE C-1. PUBLIC INQUIRIES OFFICES OF THE U.S. GEOLOGICAL SURVEY[a]

Anchorage, Alaska	Rm. 108 Skyline Bldg. 508 2nd Avenue Anchorage, AK 99501	(907) 277-0577
Los Angeles, California[b]	Rm. 7638 Federal Bldg. 300 No. Los Angeles St. Los Angeles, CA 90012	(213) 688-2850
Menlo Park, California	Bldg. 3, Rm 33 345 Middlefield Rd. Menlo Park, CA 94025	(415) 323-8111
San Francisco, California[b]	Rm. 504 Custom House 555 Battery Street San Francisco, CA 94111	(415) 556-5627
Denver, Colorado	Rm. 169 Federal Bldg. 1961 Stout Street Denver, CO 80294	(303) 837-4169
Washington, District of Columbia	Rm. 1028 GSA Bldg. 19th & F Sts. NW Washington, DC 20244	(202) 343-8073
Dallas, Texas	Rm. 1-C-45 Federal Bldg. 1100 Commerce Street Dallas, TX 75242	(214) 767-0198
Salt Lake City, Utah	Rm. 8105 Federal Bldg. 125 S. State St. Salt Lake City, UT 84138	(801) 524-5652
Reston, Virginia	Rm. 1-C-402 National Center (Stop 302) 12201 Sunrise Valley Dr. Reston, VA 22092	(703) 860-6167
Spokane, Washington	Rm. 678 U.S. Courthouse W. 920 Riverside Avenue Spokane, WA 99201	(509) 456-2524

[a] Many of these offices handle mail orders; you should generally contact the one nearest you, especially in the case of geologic maps. These offices [illegible] on bibliographic research projects. They will provide indexes of USGS quadrangles, by state, free of charge. They can also sell geologic maps and brochures, although in some cases they cannot ship topographic maps (this requires mailing tubes). They all sell topographic maps over-the-counter. For shipment of topographic maps, the reader should consult the two addresses provided at the beginning of this appendix.

[b] [illegible] geologic maps of California, Alaska, Hawaii, Arizona, Nevada, Washington, and Oregon.

[c] [illegible] Geologic maps as well

Source: Geological Survey Professional Paper 950, "Nature to be Commanded," 1978, p. 95.

The geological surveys can provide a variety of maps (topographic, geologic, seismic, etc.) depending on the location. They can also provide other data which may be useful such as books and reports or information such as seismic-refraction data. An excerpt of several reports listed in a recent USGS "New Publications of the Geological Survey" (October 1982) is included as Table C-2. These publications are issued monthly.

In addition, geologic data may be available through private sources for some locations. For example, the geology or earth science departments of universities may have geologic data for the area.

You might also consult the local telephone director to check for other branch offices of the USGS which might be located near your site or changes in telephone number or location from those listed here.

TABLE C-2. EXAMPLES OF AVAILABLE USGS DOCUMENTS[a]

OF 81-0459. Seismic-refraction data taken in southwest NEW MEXICO and southeast ARIZONA, by L. H. Jaksha, A. Garcia, and E. E. Tilgner. 19 p. (NC, De, M, T, SF, LA, U; USGS, Seventh Floor, 505 Marquette, NW. (P.O. Box 26659), Albuquerque, NM 87125; New Mexico Bur. Mines and Mineral Resources, Campus Station, Socorro, NM 87801; Arizona Bur. Geol. and Mineral Tech., 845 North Park Ave., Tucson, AZ 85719). Microfiche $3.50; paper copy $2.25.

OF 82-0837. Map showing geophysical tracklines, south-central Monterey Bay, CALIFORNIA (summer 1981), by G. W. Hill and J. L. Chin. 1 over-size sheet, scale 1:24,000 (1 inch = 2,000 feet). (NC, De, M.) Microfiche $1; paper copy $2.50.

OF 82-0832. Interpretation of an aeromagnetic survey of parts of Shannon, Carter, Oregon, and Ripley Counties in southeastern MISSOURI, by Allen Spector, with introduction by Gerda Abrams. 30 p., 1 over-size sheet, scale 1:62,500 (1 inch = 1 mile). (NC, De, M; Missouri Dept. Natural Resources, Div. Geol. and Land Survey (P.O. Box 250), Rolla, MO 65401.) Microfiche $4; paper copy $5.25.

OF 82-0655. Geological map of the Alenaio-Waipahoehoe Stream area, South Hilo District, HAWAII, by J. M. Buchanan-Banks and J. P. Lockwood. 1 over-size sheet, scale 1:24,000 (1 inch = 2,000 feet). (NC, De, M, SF, LA.) Microfiche $1; paper copy $1.75.

OF 82-0195. Bibliography of Alaskan geologic maps by 1:250,000 quadrangle, compiled by J. T. [illegible]. 73 p. (NC, De, M, A, S, SF, LA; USGS, Room 207, O'Neill Bldg., Univ. Alaska (P.O. Box 80586), Fairbanks, AK 99708; Alaska Div. Geol. and Geophys. Surveys, 3001 Porcupine Dr., Anchorage, AK 99501; and University Ave. (P.O. Box 80007), Fairbanks, AK 99708.) Microfiche $3.50; paper copy $9.

OF 82-0442. Geochemical and geostatistical evaluation, Arkansas Canyon planning unit, Fremont and Custer Counties, COLORADO, by E. F. Weiland. 113 p., 31 over-size sheets. (NC, De, M, Db, U.) Microfiche $19; paper copy $127.25.

OF 82-0488. Catalog of earthquakes in southern ALASKA, April-June 1978, by C. D. Stephens, [illegible], J. R. Pelton, K. A. Fogleman, R. A. Page, J. C. Lahr, M. A. Allen, and S. M. Helton. 37 p. (NC, De, M, A, S, SF, LA; USGS, Room 207, O'Neill Bldg., Univ. Alaska (P.O. Box 80586), Fairbanks, AK 99708; Alaska Div. Geol. and Geophys. Surveys, 3001 Porcupine Dr., Anchorage, AK 99501; and University Ave. (P.O. Box 80007), Fairbanks, AK 99708.) Microfiche $3.50; paper copy $6.75.

(continued)

TABLE D-2 (continued)

OF 82-0579. Quaternary fault map of the Basin and Range and Rio Grande rift provinces, Western United States, by J. K. Nakata, C. M. Wentworth, and M. N. Machette. 2 oversize sheets, scale 1:2,500,000 (1 inch = about 40 miles). (NC, Da, M, Dn, D, SF, LA, T, S; USGS, Seventh Floor, 505 Marquette, NW. (P.O. Box 26659), Albuquerque, NM 87125; Montana Bur. Mines and Geol., Montana Coll. Mineral Sci. and Tech., Butte, MT 59701; Nevada Bur. Mines and Geol., Univ. Nevada, Reno, NV 89557; Oregon Dept. Geol. and Mineral Industries, Room 1005, State Office Bldg., 1400 SW. Fifth Ave., Portland, OR 97201; Wyoming Geol. Survey, Univ. Wyoming (P.O. Box 3008, Univ. Station), Laramie, WY 82071). Microfiche $1; paper copy $7.

OF 82-0644. Subsurface information from eight wells drilled at the Idaho National Engineering Laboratory, by F. J. Goldstein and J. L. Weight. 36 p. (NC; USGS WRD, Idaho National Engineering Laboratory, CF-690, Room 164, Idaho Falls, ID 83401; Public Document Room, DOE's Idaho Operations Office, 550 Second St., Idaho Falls, ID 83401.) Microfiche $3.50; paper copy $4.25.

OF 82-0689. Data on subsurface storage of liquid waste near Pensacola, Florida, 1963-1980, by R. W. Hull and J. B. Martin. 104 p. (NC, WR; USGS, WRD, 325 John Knox Rd., Suite F-240, Tallahassee, FL 32303; USGS, WRD, 227 John Knox Rd., Suite L-103, Tallahassee, FL 32303.) Microfiche $3.50; paper copy $14.

OF 82-0676. Inventory of drilling activities of the U.S. Geological Survey in the United States during calendar year 1981, compiled by [illegible], Robert Hallis, and J. D. Bliss. 19 p. (NC, Da, M.) Microfiche $3.50; paper copy $1.25.

OF 82-0677. A description of colored gravity and terrain maps for the United States and adjacent Canada east of 104°, by R. W. Simpson, T. G. Hildenbrand, R. H. Godson, and M. F. Kane. 18 p. (NC, Da, M.) Microfiche $3.50; paper copy $1.25. Standard 2" by 2" color slides of these maps are available through the U.S. Geologic Survey Photo Library, Mail Stop 914, Box 25046, Denver Federal Ctr., Denver, CO 80225. Telephone (303) 234-1010.

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*Source: "New Publications of the Geological Survey," U.S. Dept. of Interior. List 891—Oct. 1982. p. 10 and 11.

APPENDIX D

AERIAL PHOTOGRAPHS

SOURCES OF AERIAL PHOTOGRAPHS

Federal Level

There are several Federal agencies which handle aerial photographs. The first source that you may want to contact is:

- NCIC Headquarters
  U.S. Geological Survey
  507 National Center
  Reston, VA 22092
  (703) 860-6045

The NCIC will send out a printout of all the agencies (Federal, state, commercial) which have photographs available for the area in question.

Thereafter, individual agencies such as the following five can be contacted:

- Aerial Photography Field Office
  ASCS-USDA
  P.O. Box 30010
  Salt Lake City, Utah 84130
  801-524-5856

This agency has all ASCS photos, all Forest Service photos, and many others (some USGS, National High Altitude Photos (Nhap), etc.). Besides providing photos through the mail, the ASCS serves as a public reference facility. Any maps they have can be used by the public by visiting their facility. Aerial photos available through ASCS go back historically to 1944; their archives go into the 1930's.

- EROS Data Center
  U.S. Geological Survey
  Sioux Falls, South Dakota 57198
  (605) 594-6511 X151 for cartographic unit

EROS has Landsat and U-2 photos, mainly black and white at 1:80,000 scale, flown at the same time as the color photos for Landsat. They do computer searches to retrieve listings of all available photos.

- Soil Conservation Service
  USDA-SCS
  P.O. Box 6567
  Fort Worth, TX 76115
  (817) 334-5292

The SCS has consolidated its branches into this one office. SCS supplies mostly low-altitude photos.

- National Archives
  841 South Pickett Street
  Alexandria, VA 22304
  (703) 756-6700

The National Archives should be contacted for archival photographs. All of these agencies will require some identification of site location by the applicant. This may be in the form of a copy of a town engineer's map; a Department of Transportation (DOT) map; a description of the township, range and section; a hand-drawn [illegible] of the site and its location in regard to a nearby town; a copy of the [illegible] of a USGS quadrangle that shows the site; the latitude/longitude coord[illegible] of the site area, etc. In all cases, the exact site location should be [illegible] out and the topographic quadrangle used noted. Any details that will [illegible] the agency provide aerial coverage of the area in question should be included. Each agency also has forms available for requesting photographs.

If the site is near the U.S.-Canada border, it may also be useful to contact:

- The National Air Photo Library
  Surveys and Mapping Branch
  Department of Energy, Mines, and Resources
  615 Booth Street
  Ottawa, Ontario K1A 0E9

Interstate Level

Table D-1 provides a listing of interstate agencies which are likely to have aerial coverage for their representative areas.

State Level

Numerous state agencies are likely to maintain aerial photographs on file. If the sources previously outlined are too remote or do not have the information you are looking for, you may be able to obtain photos from state pollution control agencies, health departments, water resources departments, and state highway departments as well.

Private Companies

A wide selection of photographic negatives are held by private aerial survey companies and most often can be ordered directly from these sources.

TABLE D-1. INTERSTATE AGENCIES WHICH ARE LIKELY TO HAVE AERIAL PHOTOGRAPHY COVERAGE

Bi-State Agency

Bi-State Development Agency
915 Olive Street
St. Louis, MO

Delaware River

Interstate Commission on the Delaware River Basin
Suburban State Building
Philadelphia, PA

New England

New England Interstate Water Pollution Control Commission
73 Tremont Street
Boston, MA

Klamath River Compact Commission

Klamath River Compact Commission
P.O. Box 388
Sacramento, CA

New York/New Jersey/Connecticut

Interstate Sanitation Commission
10 Columbus Circle
New York, NY

Ohio River

Ohio River Valley Water Sanitation Commission (ORSANCO)
414 Walnut Street
Cincinnati, OH

Interstate Commission on the Potomac River Basin

203 Transportation Building
Washington, D.C.

Names and addresses of leading photogrammetric companies may be found in current issues of "Photogrammetric Engineering", the Journal of the American Society of Photogrammetry, or through local telephone listings. Photo indexes and costs can usually be obtained by direct inquiry to the appropriate agency.

TYPES OF AERIAL PHOTOGRAPHS NEEDED FOR ANALYSIS

Air photo analysis is best done using a multistage approach; i.e., one looks first at high-altitude photography and works down to a lower level. For this reason, Landsat imagry (EROS) is important as it provides a large scale and an analyst can identify lineaments. One could then use smaller scale U-2 photographs for the same area (1:125,000 scale) at which point the analyst can eliminate the man-made features such as power-lines, old tree cuts, etc. Finally, low-altitude photos such as those produced by the Soil Conservation Service at 1:20,000 scale could be used.

It is desirable to use photos which are multiseasonal; winter is usually best as this provides a low sun angle and minimal leaf color. To increase the sensitivity of analysis, many variations can be considered, such as side lap, seasonal difference, use of stereoscopy, etc.

APPENDIX E

AERIAL RECONNAISSANCE FLIGHT PLANNING

To prepare for an aerial reconnaissance flight, the aid of a person experienced in aerial photography will be required. Some guidelines on flight planning are presented in Table E-1. Aerial reconnaissance of an area entails planning the flight (height, season, number of flight lines, etc.) and checking to be sure these specifications are followed. When photos are delivered for a project, one reviews properties such as excessive crab, tilt, scale differential and photo quality. The applicant should refer to the U.S. Forest Service (USFS) Lake States Station Paper 96 which details procedures and reasons for making such checks. After the flight, post-flight interpretation of photos is performed.

TABLE E-1. CONSIDERATIONS IN AERIAL RECONNAISSANCE FLIGHT PLANNING

Specifications and Equipment Considerations

- Average forward overlap[a]
- Desired photo scale
- Focal length
- Flight ground speed
- Intervalometer[b]
- Film format

Computations

- Flying height above terrain and height above mean sea level
- Direction and number of flight lines
- Adjusted distance between flight lines
- Adjusted percent of side lap or end lap[c]
- Map distance between flight lines
- Unadjusted distance between exposures on each line
- Time between exposures
- Map distance between exposures on each line
- Number of exposures on each line
- The amount of film required (feet and number of rolls)

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[a] Overlap is the amount that one photograph overlaps the area covered by the other, customarily expressed as a percentage.

[b] A timing device for automatically operating the shutter of a camera at any predetermined interval.

[c] Side lap is the overlap between photographs in adjacent parallel flights; end lap is the overlap between photos in the same flight.

Source: Eugene T. Avery. Interpretation of Aerial Photographs. 2nd Edition, Burgess Publishing Company, Minneapolis, MN, 1968.

APPENDIX F

QUALITY ASSURANCE/QUALITY CONTROL
(Reprinted from Section Ten of
Test Methods for Evaluating Solid Waste,
SW-846. U.S. EPA, 1982)

"Section 10.1 defines Quality Control (QC) and Quality Assurance (QA). Section 10.2 discusses how QC/QA procedures can be used to ensure achievement of program goals. The various QC/QA aspects of sampling are discussed in Section 10.1.3 while Section 10.1.4 discusses and lists appropriate laboratory QC/QA activities. Section 10.1.5 discusses the criteria with which acceptable data must comply and methods of data evaluation.

10.1 Introduction

Quality assurance (QA) is a system for ensuring that all information, data, and resulting decisions compiled under a specific task are technically sound, statistically valid, and properly documented. Quality control is the mechanism through which quality assurance achieves its goals. Quality control programs define the frequency and methods of checks, audits, and reviews necessary to identify problems and dictate corrective action, thus verifying product quality.

The soundness of an organization's QC/QA program has a direct bearing on the integrity of its sampling and laboratory work. Results of sampling or analysis conducted without adequate quality control and assurance may be deemed unacceptable for RCRA evaluation purposes. The following section discusses some minimum standards for QC/QA programs. Generators who are choosing contractors to perform sampling or analytical work should make their choice only after evaluating the contractor's QC/QA program against the procedures presented in these sections. Likewise, contractors that currently sample and/or analyze solid wastes should similarly evaluate their QC/QA programs.

10.2 Program Design

The initial step for any sampling or analytical work should be to strictly define the program goals. Once the goals have been defined, a program must be designed that will meet these program goals. QC and QA measures will be the mechanisms used to monitor the program and to ensure that all data generated are suitable for their intended use. A knowledgeable person who is not directly involved in the sampling or analysis must be assigned the responsibility of ensuring that the QC/QA measures are properly employed.

As a minimum, a proper QC/QA program would include the following:

1. The intended use(s) for the data, and the necessary level of precision and accuracy of the data for these intended uses.

"2. A representative sampling plan that includes provisions for:

- selecting appropriate sampling locations, depths, etc.
- providing a statistically sufficient number of sampling sites.
- measuring all necessary ancillary data.
- determining climatic flow or other conditions under which sampling should be conducted.
- determining which media are to be sampled (e.g., wastewater, sediment, effluent, soil).
- determining which parameters are to be measured (and where).
- selecting appropriate sample containers.
- selecting the frequency of sampling and length of sampling period.
- selecting the types of sample (e.g., composites vs. grabs) to be collected.
- sample preservation.
- chain-of-custody.

3. An analytical plan that includes:

- chain-of-custody procedures.
- appropriate sample preparation methods.
- appropriate analytical methods.
- appropriate calibration and analytical procedures.
- data handling, review and reporting.

4. Planning for the inclusion of proper and sufficient QC/QA activities, including the use of QC samples throughout all phases of the study to ensure that the level of quality of the data will meet the requirements of the intended use(s) of the data.

All program details should be put in writing and assignments made to appropriate personnel.

If the above procedures are followed (i.e., an appropriate program is designed, tasks are assigned to knowledgeable personnel, and sufficient QC/QA "steps are employed), the program should meet and possibly surpass its goals in most cases; at worst the failure to meet the program goals will be detected and the usefulness of any data will be quantified.

10.3 Sampling

The quality of a sampling program has a direct bearing on the legal, physical, and chemical integrity of the samples. If the representativeness of the samples cannot be verified due to inadequate attention to sampling procedures, then the usefulness of the analytical data will be limited, regardless of the refinement of the analytical program. It is imperative, therefore, that no analytical program be conducted without an adequate sampling plan which does or will document the degree of representativeness of the parameters of interest.

10.3.1 Design of a Sampling Plan

Section One of this manual discusses the considerations involved in designing a representative sampling plan. For each specific project, a sampling plan should be designed prior to commencement of sampling. If the plan addresses the considerations discussed in Section One, then the resulting samples should be representative of the waste of interest and therefore suitable for evaluation of the waste according to RCRA criteria.

10.3.2 Sample Collection

A variety of different sampling devices are used in sampling depending on the type of sample (solid, liquid, multiphased), the type of sample container, and the sampling location. Section One and portions of Section Three of this manual describe different devices that are available. The appropriate sampling device must be selected and its use supervised by a person thoroughly familiar with both the sampling and analytical requirements. This familiarity is essential since (1) certain sampling devices are made of materials that may contaminate samples, (2) cross contamination of samples can occur if the sampling device is not cleaned properly, (3) routine sampling methods may not be applicable when the waste is to be analyzed for a different parameter (e.g., volatile organic compounds), and (3) the method of employing the sampling devices may affect the integrity of the sample.

10.3.3 Sample Preservation

Some form of preservation is usually required for all samples. The type of sample preservation required will vary depending on the sample type and the parameter to be measured. Therefore, more than one container of the same waste may be necessary if the waste is to be analyzed for more than one parameter type.

"The analytical methods included in this manual refer to the optimum means of preservation. Since the chemical make-up of certain samples can alter the effectiveness of preservation measures, all sample analyses should be performed as soon as possible after sampling and before any recommended holding time has expired.

10.3.4 Chain of Custody

Although chain-of-custody procedures may not be required in all cases, they often are an essential part of sampling/analytical schemes since these procedures can document the history of samples. Chain of custody establishes the documentation and control necessary to identify and trace a sample from sample collection to final analysis. Such documentation includes labeling to prevent mix-up, container seals to detect unauthorized tampering with contents of the sample containers, secure custody, and the necessary records to support potential litigation.

A sample is considered to be under a person's custody if (1) it is in the person's physical possession, (2) in view of the person, (3) secured by that person so that no one can tamper with the sample, or (4) secured by that person in an area that is restricted to authorized personnel.

Refer to Section One for details of how to implement chain-of-custody procedures.

10.4 Analysis

An analytical program defines standard operating procedures to be used in waste analysis, appropriate QC/QA procedures. means for detecting out-of-control situations, and remedial actions. A separate analytical program should be developed for each different waste to be analyzed. The program should be thoroughly specified before sampling is begun, since the analytical procedures to be used may affect the choice of sampling devices and procedures.

The program should select methods that will provide data at the level of accuracy and precision that will be required by users of the data for decision-making purposes under RCRA. Once the appropriate method(s) have been selected it is imperative that the accuracy and precision of all analytical data be thoroughly documented by means of a well-designed QC/QA program.

Laboratory QC/QA activities normally include:

1. Use of EPA-acceptable sample preparation and analytical methods.

2. Calibration of laboratory instruments to within acceptable limits according to EPA or manufacturer's specifications before, after, and during (as acceptable) use. Reference standards must be used when necessary.

"3. Periodic inspection, maintenance, and servicing (as necessary) of all laboratory instruments and equipment.

4. The use of reference standards and QC samples (e.g., checks, spikes, laboratory blanks, duplicates, splits) as necessary to determine the accuracy and precision of procedures, instruments, and operators.

5. The use of adequate statistical procedures (e.g., QC charts) to monitor the precision and accuracy of the data and to establish acceptable limits.

6. A continuous review of results to identify and correct problems within the measurement system (e.g., instrumentation problems, inadequate operator training, inaccurate measurement methodologies).

7. Documenting the performance of systems and operators.

8. Regular participation in external laboratory evaluations (including the EPA Performance Audit Program) to determine the accuracy and overall performance of the laboratory. This should include performance evaluation and interlaboratory comparison studies, and formal field unit/laboratory evaluations and inspections.

9. Use of acceptable sample identification and, as necessary, formal chain-of-custody procedures in the laboratory.

10. Maintenance and storage of complete records, charts, and logs of all pertinent laboratory calibration, analytical, and QC activities and data.

11. Ensuring all data outputs are presented in their prescribed format.

Specific Quality Control measures for each method can be found by referring to the individual analytical methods included in this manual.

10.5 Data Handling

The quality of all data must be assessed before the data are used. Assessment should focus on five basic points.

1. Accuracy - Can the data's accuracy be determined, and is it acceptable for the planned use? QC/QA procedures will be designed to measure the accuracy of all analytical data.

2. Precision - Can the data's precision be determined, and is it acceptable for the planned use? QC/QA should demonstrate the reproducibility of the measurement process.

"3. Completeness - Are a sufficient amount of data available for the planned use? QC/QA shall identify the quantity of data needed to meet the program goals.

4. Representativeness - How well do the data represent actual conditions at the sampling location, considering the original study design, sampling methods, analytical methods, etc., which were used?

5. Comparability - How comparable are data with respect to several factors, including:

   - consistency of reporting units?
   - standardized siting, sampling, and methods of analysis?
   - standardized data format?

All these factors must be considered when designing a study, and QC/QA procedures must specify a reviewing process for all data.

Statistical procedures applicable to data evaluation include:

1. Central tendency and dispersion

   - Arithmetic mean
   - Range
   - Standard deviation
   - Relative standard deviation
   - Pooled standard deviation
   - Geometric mean

2. Measures of variability

   - Accuracy
   - Bias
   - Precision; within laboratory and between laboratories

3. Significance test

   - u-test
   - t-test
   - F-test
   - Chi-square test

Specific data handling precautions are noted in the individual methods described in this manual."